Overview

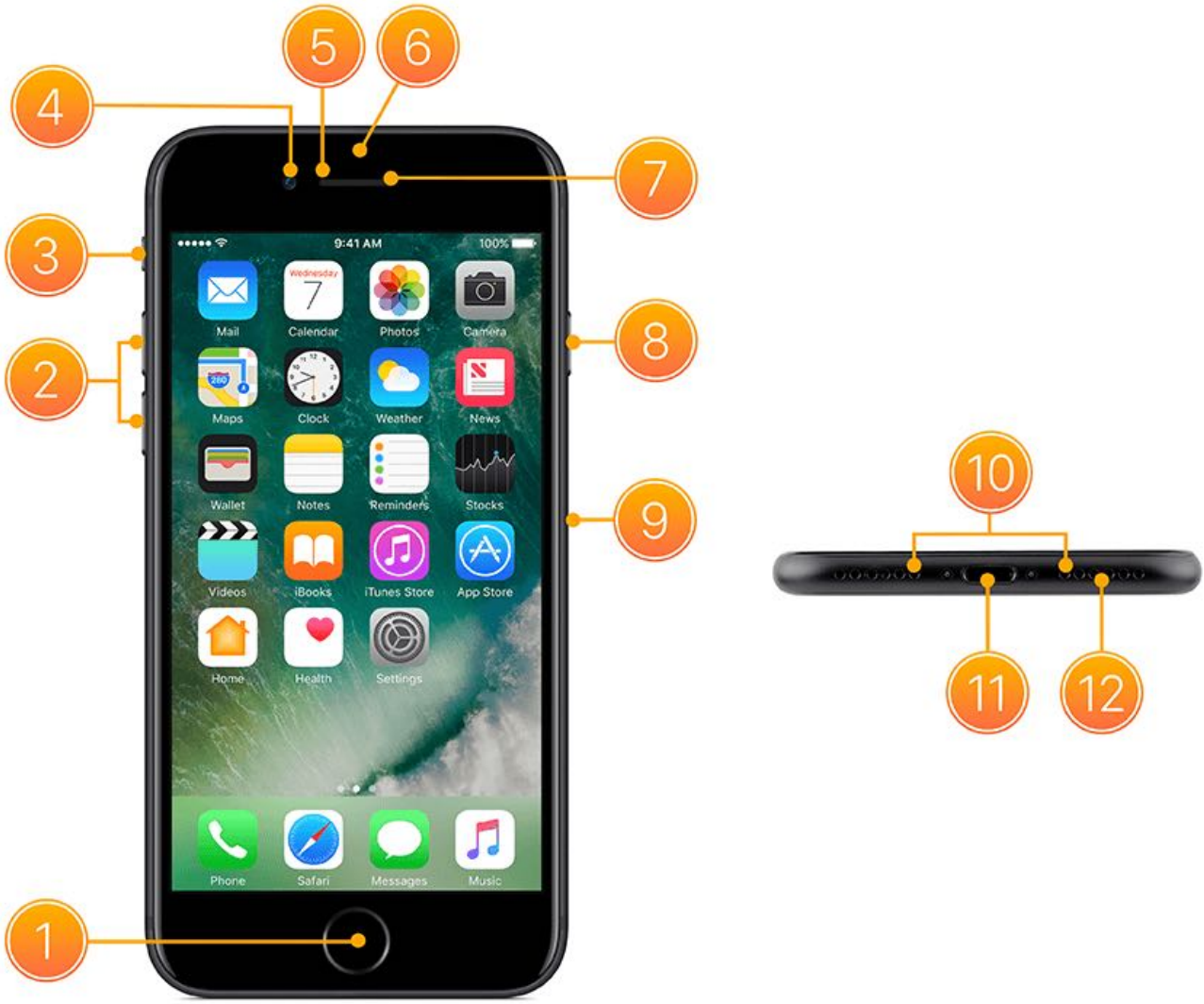
Scope of this Document

This Service Guide provides troubleshooting steps, take-apart procedures, and other information about iPhone 7 and iPhone 7 Plus. Other iPhone models are covered in separate guides.

Features

Available in rose gold, gold, silver, black, and Jet black colors, iPhone 7 and 7 Plus feature:

- A10 Fusion chip
- Retina HD display with wide color gamut
- New Home button
- Taptic Engine
- New 12-megapixel camera with optical image stabilization
- Wide color capture
- Stereo speakers
- 7-megapixel FaceTime HD camera
- LTE Advanced up to 450 Mbps
- Touch ID
- Apple Pay
- iOS 10
- Water and dust resistant



1. Home button/Touch ID sensor
2. Volume up/down
3. Ring/silent
4. FaceTime camera
5. Microphone
6. Proximity sensor
7. Receiver (stereo speaker)
8. On/off, Sleep/wake
9. SIM tray
10. Bottom microphones
11. Lightning connector
12. Stereo speaker

Service Considerations

Important: Before servicing a device, ensure that the customer has disabled Find My iPhone in Settings. For more information, refer to article HT201365: Find My iPhone Activation Lock.

- **Reset Procedure:** To reset iPhone 7 and 7 Plus, press and hold both the Sleep/wake button and the Volume down button for at least 10 seconds, until the Apple logo appears.
- **Stereo Speakers:** The receiver and bottom speaker are used together as stereo speakers. The left and right sound channels are routed to the speaker or receiver based on the orientation of the iPhone.
- **Camera:** The camera used in iPhone 6 Plus, 6s Plus, 7, and 7 Plus periodically self-calibrates to capture sharp images. When the iPhone is placed on a flat, level surface for 5–10 seconds, the camera will perform a quick calibration. When the iPhone is plugged in and placed on a flat, level surface for 5–10 minutes, the camera will perform an extended calibration. During the extended calibration, the iPhone may become warm to the touch.
- **Apple Pay in Japan:** iPhone 7 and 7 Plus sold in Japan have specific hardware that allows customers to make Apple Pay purchases at stores in Japan. These devices can not be used to make Apple Pay purchases at stores outside of Japan. Apple Watch models sold outside of Japan will not be able to complete Apple Pay transactions at stores within Japan. Refer to articles HT207152: Using Apple Pay in stores, and within apps and websites in Japan and HT207154:

Using Suica on iPhone or Apple Watch in Japan.
Important: For Japanese devices, be sure to have the user remove any Suica card from Apple Pay before proceeding with service.

New Tools and Fixtures

To open iPhone 7 and 7 Plus, be sure to use an updated Universal Display Removal Fixture and the Display Removal Fixture Adapter with the suction cups set to the correct position. The suction cups should be set in the position closest to the Home button without overlapping the Home button.

Use an updated Display Press to apply the correct pressure for 15 seconds to properly adhere the display to the enclosure. Refer to the following articles:

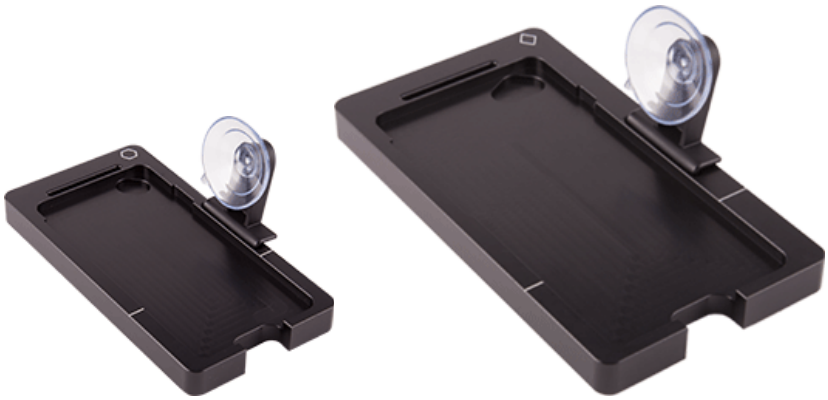
- RP1326: iPhone 7: Open Device
- RP1333: iPhone 7 Plus: Open Device

For more information about updating your existing fixtures, refer to article TP1531: iPhone Fixture Update - Universal Display Removal Fixture and Display Press.

Caution:

- An incorrect position or the use of other fixtures may cause damage to the device.
- Fixtures that clamp the iPhone may damage the enclosure. iPhone 7 and 7 Plus displays are adhered to the enclosure.

Once the device has been opened, use the 4.7-inch (923-01291) or 5.5-inch (923-01292) Repair Tray to support it. The 4.7-inch Repair Tray is identified by a hexagon on the fixture and the 5.5-inch Repair Tray is identified by a diamond on the fixture. Each iPhone will only fit correctly in the appropriate repair tray.



The display cowlings in iPhone 7 and 7 Plus are installed using trilobe screws that require a MicroStix bit (923-01290) to remove.

The camera cowling in iPhone 7 Plus is installed with a superscrew with required a superscrew bit (923-01289) to remove.

Screws replaced during a repair must be tightened to a specific torque value. There are four iPhone torque drivers to set

screws to the correct torque value. Use only the driver that is specifically called for in the take-apart instructions. The correct driver is also noted in the screw diagram section of the appropriate article:

- TP1518: iPhone 7: Internal View, Parts List, Screw Diagram
- TP1519: iPhone 7 Plus: Internal View, Parts List, Screw Diagram

1. iPhone torque driver (gray), 0.55 kg-fcm (923-00738)
2. iPhone torque driver (black), 0.35 kg-fcm (923-0248)
3. iPhone torque driver (green), 0.45 kg-fcm (923-00105)
4. iPhone torque driver (blue), 0.65 kg-fcm (923-0448)

Identifying iPhones

Serial Number and Other Product Identifier Locations

iPhones that use GSM technology have an International Mobile Equipment Identity (IMEI). iPhones that use CDMA technology have a Mobile Equipment Identifier (MEID). Both IMEI and MEID have the same function: to uniquely identify a mobile device on a cellular network.

There are several ways to find the iPhone serial number and IMEI/MEID. Refer to article HT204073: Find the serial number or IMEI on your iPhone, iPad, or iPod touch.

1. The IMEI number can be found on the hardware.

- iPhone 6 and 6 Plus only

- iPhone 6s, 6s Plus, 7, and 7 Plus

2. If the iPhone is operational, then the serial number, IMEI/MEID, and ICCID can be found in **Settings > General > About**.

3. With the iPhone connected to a computer, click the Summary tab in iTunes. The iPhone serial number and phone number will show in the iTunes window.

Notes: You can choose Edit > Copy to put the serial number on the Clipboard. If you click the “Phone Number” text, then iTunes will display the iPhone IMEI/MEID. If you then click the “IMEI (or MEID)” text, then iTunes will display the iPhone ICCID.

4. If the iPhone is displaying the “Hello” screen, then tap the “i” at the lower right of the screen to view the IMEI/MEID and ICCID.

5. The IMEI can be obtained by dialing *#06# on the phone keypad.

Model Numbers and Configuration Codes

iPhone models can be identified by the model number engraved on the back case. **Note:** The location of engraving may vary by model. Refer to article HT201296: Identify your iPhone model for information on identifying all iPhone models.

All iPhone models have a unique configuration code (the last four characters of the serial number) that is specific to each model type, color, and capacity. The configuration codes listed in the tables below are the best way to precisely determine which model is being serviced.

Note: An iPhone that has been modified without the written permission of Apple is **not eligible for warranty service**. To identify a modified phone, compare the serial number in Settings > General > About to the serial number seen in iTunes, or compare the physical attributes to the attributes listed in the configuration code tables below. (The modification may have been performed by an unauthorized service center of which the user is unaware.)

iPhone 6	A1549 MM	A1586 A1589 MM-TD
128GB Space Gray	G5MK	G5MW
128GB Silver	G5ML	G5MY
128GB Gold	G5MM	G5N0
64GB Space Gray	G5MG	G5MR
64GB Silver	G5MH	G5MT
64GB Gold	G5MJ	G5MV
32GB Space Gray	HYFK	HXR5
32GB Gold	HYFL	HXR6
16GB Space Gray	G5MC	G5MN
16GB Silver	G5MD	G5MP
16GB Gold	G5MF	G5MQ

iPhone 6 Plus	A1522 MM	A1524 A1593 MM-TD
128GB Space Gray	G5QM	G5R0
128GB Silver	G5QN	G5R1
128GB Gold	G5QP	G5R2
64GB Space Gray	G5QJ	G5QV
64GB Silver	G5QK	G5QW
64GB Gold	G5QL	G5QY
16GB Space Gray	G5QF	G5QQ
16GB Silver	G5QG	G5QR
16GB Gold	G5QH	G5QT

iPhone 6s	A1633	A1688 A1691 A1700
128GB Space Gray	GRY1	GRYG
128GB Silver	GRY2	GRYH
128GB Gold	GRY3	GRYJ
128GB Rose Gold	GRY4	GRYK
64GB Space Gray	GRXW	GRY9
64GB Silver	GRXX	GRYC
64GB Gold	GRXY	GRYD
64GB Rose Gold	GRY0	GRYF
32GB Space Gray	HFLM	HFLR
32GB Silver	HFLN	HFLT
32GB Gold	HFLP	HFLV
32GB Rose Gold	HFLQ	HFLW
16GB Space Gray	GRXQ	GRY5
16GB Silver	GRXR	GRY6
16GB Gold	GRXT	GRY7
16GB Rose Gold	GRXV	GRY8

iPhone 6s Plus	A1634	A1687 A1690 A1699
128GB Space Gray	GRX7	GRX8
128GB Silver	GRXC	GRXD
128GB Gold	GRXG	GRXH
128GB Rose Gold	GRXK	GRXL
64GB Space Gray	GRWT	GRWV
64GB Silver	GRWX	GRWY
64GB Gold	GRX1	GRX2
64GB Rose Gold	GRX4	GRX5
32GB Space Gray	HFLX	HFM2
32GB Silver	HFLY	HFM3
32GB Gold	HFM0	HFM4
32GB Rose Gold	HFM1	HFM5
16GB Space Gray	GRWD	GRWF
16GB Silver	GRWH	GRWJ
16GB Gold	GRWL	GRWM
16GB Rose Gold	GRWP	GRWQ

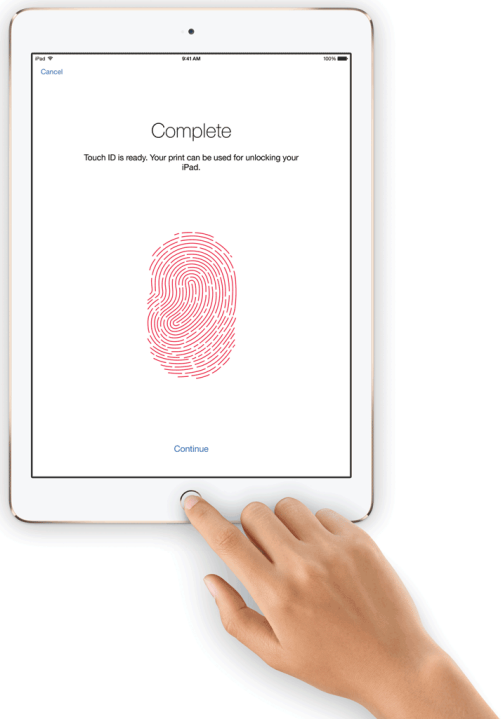
iPhone 7	A1778	A1779	A1660 A1780
256GB Black	HG7Q	HG87	HG76
256GB Silver	HG7R	HG88	HG77
256GB Gold	HG7T	HG89	HG78
256GB Rose Gold	HG7V	HG8C	HG79
256GB Jet Black	HG7W	HG8D	HG7D
256GB Red	HX99	HX9D	HX97
128GB Black	HG7K	HG82	HG71
128GB Silver	HG7L	HG83	HG72
128GB Gold	HG7M	HG84	HG73
128GB Rose Gold	HG7N	HG85	HG74
128GB Jet Black	HG7P	HG86	HG75
128GB Red	HX98	HX9C	HX96
32GB Black	HG7F	HG7X	HG6W
32GB Silver	HG7G	HG7Y	HG6X
32GB Gold	HG7H	HG80	HG6Y
32GB Rose Gold	HG7J	HG81	HG70

iPhone 7 Plus	A1784	A1785	A1661 A1786
256GB Black	HFYF	HFYT	HFY2
256GB Silver	HFYG	HFYV	HFY3
256GB Gold	HFYH	HFYW	HFY4
256GB Rose Gold	HFYJ	HFYX	HFY5
256GB Jet Black	HFYK	HFYY	HFY6
256GB Red	HX9K	HX9L	HX9J
128GB Black	HFY7	HFYL	HFXW
128GB Silver	HFY8	HFYM	HFXX
128GB Gold	HFY9	HFYN	HFXY
128GB Rose Gold	HFYC	HFYP	HFY0
128GB Jet Black	HFYD	HFYQ	HFY1
128GB Red	HX9G	HX9H	HX9F
32GB Black	HG04	HG08	HG00
32GB Silver	HG05	HG09	HG01
32GB Gold	HG06	HG0C	HG02
32GB Rose Gold	HG07	HG0F	HG03

Touch ID

Overview

Touch ID is a feature available on iPhone 5s or later, iPad mini 3 or later, iPad Air 2, iPad (5th generation), and iPad Pro models to secure the device from unauthorized access and allow users to authenticate into the iTunes store.



Touch ID can read multiple fingerprints and can read them in any orientation. All fingerprint information is encrypted and stored securely in the Secure Enclave on the user's device. Fingerprint data is not backed up to iCloud or to iTunes. When performing an erase of all content and settings, inform the user that fingerprint data will be lost and that Touch ID setup will be required.

As the feature is used, Touch ID will continue to learn and improve recognition of the user's fingerprint over time.

Using Touch ID sets the "Require Passcode" setting to "Immediately." The user will still have the option of entering the passcode, if desired. The user will be required to enter the passcode to unlock the device in certain situations:

- When the device is restarted
- When 48 hours have passed from the last time the device was unlocked
- When enrolling a new fingerprint after deleting all existing fingerprints

The user can use Touch ID instead of entering an Apple ID password to purchase content from the iTunes Store, the App Store, and the iBooks Store.

Note: Touch ID cannot be used for purchases if Require Password in Settings > General > Restrictions is set to Immediately.

Servicing Touch ID

Not everyone will be able to use the fingerprint scanner feature. Some people lack the impedance necessary to activate biometric devices. Do not submit these devices for repair.

- Have the customer try to activate a known-good device with Touch ID, if possible, to verify whether the customer falls within this very small minority of users.
- Clean dirt or debris from the Touch ID sensor with a clean, lint-free cloth.
- Ensure that fingers are clean and dry. **Note:** Moisture, lotions, sweat, oils, cuts, or particularly dry skin may affect fingerprint recognition. Certain activities can also temporarily affect fingerprint recognition, including exercising, showering, swimming, cooking, or other conditions or changes that affect your fingerprint.
- Check for obstructions (such as a screen protector) around the sensor and ring.

Do not service or replace the device for issues with a specific finger or fingers. If the customer has an issue with certain fingers, then explain that in some cases Touch ID may be unable to match those fingers consistently. This is usually caused by the readability of that fingerprint, and the customer can try to enroll the finger at a later time or use a different finger for Touch ID. If you and the customer are both unable to enroll any fingers on the device, then this indicates that there is an issue with the Touch ID sensor and the device should be serviced.

Refer to article HT201371: Use Touch ID on iPhone and iPad for more information.

Night Shift

Overview

Night Shift gradually shifts display white balance to the warmer end of the spectrum (slightly redder, less bluish hues). Once shifted, the setting does not automatically adjust to further changes in ambient lighting conditions. Night Shift regulates the impact of blue light emitted at nighttime to alleviate user eye strain.

Night Shift is available on iPhone 5s or later, iPad mini 2 or later, iPad Air models, iPad (5th generation), iPad Pro models, and iPod touch (6th generation), running iOS 9.3 or later.

Night Shift can use location and time to determine sunset and sunrise times or use a schedule. The default schedule is 10PM–7AM. Night Shift's transition time is 30 minutes.

Night Shift can be manually activated in Settings or Control Center.

Troubleshooting

Important: Night Shift affects the colors displayed on the device. If the user or technician has vision perception issues such as color-blindness, the issue may be perceived differently. You may need to ask another person or service technician without vision perception issues to help verify the issue.

1. Place the user's device side-by-side with a known-good, similar device showing the same image in the same app.

   Run Display Backlight and Color / Display Image Quality diagnostics in AST 2 on both devices to compare images. The color images in these diagnostics are helpful for finding and comparing image quality differences.

   If AST 2 is not available, compare both devices using a white image, such as a blank email message.

   Important: Verify that both devices are running identical environments (same app, settings, iOS versions).

2. Go to Settings > General > Accessibility. Verify that Invert Colors, Grayscale, and Increase Contrast are disabled. These settings may override Night Shift settings.

3. Go to Settings > Display & Brightness. Verify that Auto-Brightness is on and that the Brightness settings are identical on both devices.

4. Go to Settings > Display & Brightness on both devices and toggle Night Shift off and on. Compare the user's device with the known-good device.

Important: Perform all troubleshooting in a well-lighted environment that has neutral, even lighting. Avoid testing in a dark room or in an environment that is illuminated with non-neutral lighting, such as colored lighting. Place both devices side by side on a flat, horizontal surface. View the devices from the same angle. Do not hold the devices at different angles.

Refer to article HT202613: Adjust the display settings on your iPhone, iPad, or iPod touch for more information about using Brightness settings.

iOS

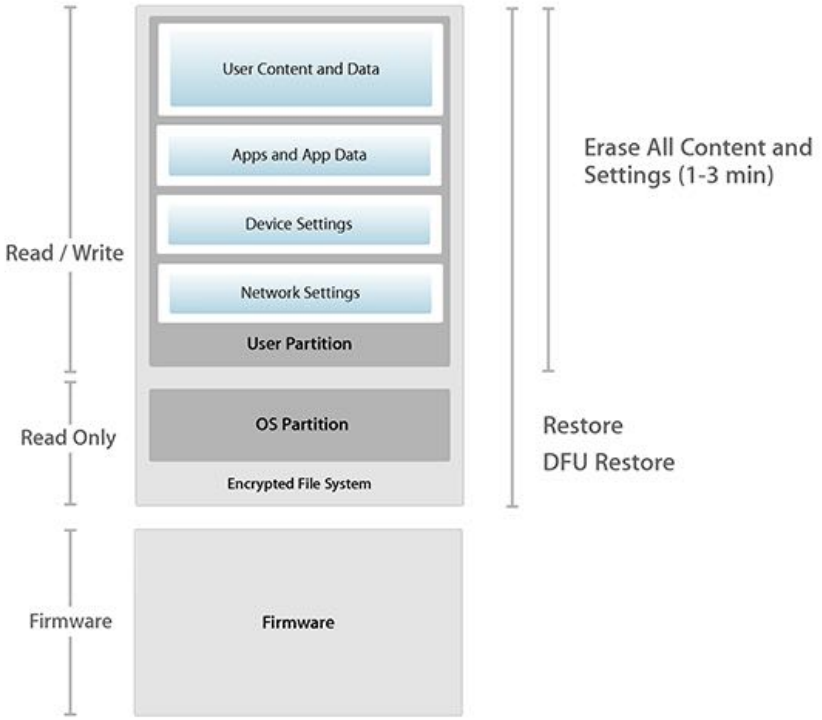
Overview

iOS 10 is the latest mobile operating system for iPhone, iPad, and iPod touch. iOS 10 is compatible with iPhone 5 or later, iPad mini 2 or later, iPad (4th generation) or later, iPad Air models, iPad Pro models, and iPod touch (6th generation).

Service Considerations

Restore Types and File System
Issues with software may be resolved by erasing or restoring the device. Most issues reside in the read/write portion of the file system; the read-only portion cannot be modified by the user. It is not necessary to perform a restore or a DFU restore in most cases. Use a restore or DFU restore only if the device was interrupted during an update, if the device appears not to turn on, or if a Service Guide contains instructions that specifically call for a restore.

Note: If the device is connected to iTunes, then updating the software may resolve an issue without erasing content and settings. If updating the software does not work, then it may be necessary to restore the device, which will erase all content and settings.



Troubleshooting

Refer to article TP880: Common Troubleshooting Procedures for more details.

To isolate a software issue, use the following steps.

1. Have the user create a backup (using either iCloud or iTunes) so that the data on the device is saved. Refer to article TP322: Back Up User Data for more details.
2. Update to the latest software.
3. Restart the device.
4. Erase all contents and settings (Settings > General > Reset > Erase All Content and Settings).
5. Set up the device as new, without restoring from backup.
6. Test the device hardware and iOS for the original issue. If the issue cannot be reproduced, do not replace the device.
7. Restore from backup. If restoring from either backup (iCloud or iTunes) causes the software issue to return, then there is no reason to restore from the other backup method as it will lead to the same result.

iOS Diagnostics
Search for article “AST 2 for iOS Reference Guide - Table of Contents” for more information.

> Apple Service Toolkit 2 (AST 2) is a cloud-based diagnostic system to help technicians triage and verify repairs for most Apple devices.

AST 2 for iOS currently supports Apple devices running iOS 8.1 or later and Apple Watch.
Some diagnostic tests and tools in AST 2 require the device under test to be running iOS 9 or later.

Apple Apps
Apple apps may be hidden from the home screen. These apps are not deleted as they are part of iOS. These apps can be restored by searching the App Store and touching the Download button.

Music > Optimize Storage
This feature will automatically remove songs that have not been played in a while.

Battery
Refer to article HT201264: About the battery usage on your iPhone, iPad, and iPod touch and HT205234: Use Low Power Mode to extend battery life on your iPhone for detailed information.

Low Power Mode
This feature allows users to increase battery life by reducing some functionality. Email fetch, Hey Siri, Background App Refresh, Automatic Downloads, and some visual effects are reduced or turned off.
Low Power Mode can be turned on manually in Settings > Battery.
When Low Power Mode is active, the battery icon will appear yellow and the battery percentage will be displayed.

Battery Usage
Settings > Battery > Battery Usage displays battery usage by app.
This feature can display the percentage of battery use by day or week.
The Home screen and Lock screen will usually have the highest usage.
Apps that have been given permission to run in the background will be noted as “background activity.”

Wi-Fi Assist
Refer to article HT205296: About Wi-Fi Assist for more information.

Wi-Fi assist allows a device running iOS 9 or later to stay connected to the Internet even with a poor Wi-Fi connection.
If the Wi-Fi signal strength drops too low, then the device will seamlessly switch to cellular data.
Wi-Fi Assist is turned on by default.
Any iOS device that has a cellular data plan and is running iOS 9 or later can use Wi-Fi assist, except for iPhone 4s, iPad 2, iPad (3rd generation), and iPad mini (1st generation).

iTunes

iTunes may be used to restore or update a device to iOS 10. General system requirements for iTunes 12.5.5 are listed below; detailed requirements are listed on the download page. Download iTunes from www.apple.com/itunes/download/.

Mac Software System Requirements

- OS X version 10.9.5 or later
- 400MB of available disk space
- Apple Music, Apple Music Radio, iTunes in the Cloud, and iTunes Match availability may vary by country
- iTunes Extras require OS X version 10.10.3 or later

Windows Software System Requirements

- Windows 7 or later
- 64-bit editions of Windows require the iTunes 64-bit installer; for more information, visit www.apple.com/itunes/download/
- 400MB of available disk space
- Screen reader support requires Window-Eyes 7.2 or later; for information about accessibility in iTunes, visit www.apple.com/accessibility
- iTunes is now a 64-bit application on 64-bit versions of Windows. Some third-party visualizers may no longer be compatible with this version of iTunes. Please contact the developer for an updated visualizer that is compatible with

iTunes 12.1 or later
- Apple Music, Apple Music Radio, iTunes in the Cloud, and iTunes Match availability may vary by country

An Apple ID is required for some iOS features. Refer to article TP318: Apple ID for specific features and Apple ID troubleshooting.

Apple ID

Many iOS features require an Apple ID, including:

- App, iTunes, and iBooks Stores
- Apple Music
- Apple Pay
- Game Center
- iCloud
- iMessage
- Find My Friends
- Find My iPhone

While troubleshooting, you may isolate a user's issue to his or her Apple ID. You should help users resolve issues with their existing Apple IDs, instead of creating new ones. Creating a new Apple ID for a user who already has one can confuse the user and cause the creation of multiple iTunes and App Store accounts.

Refer users who do not know if they have Apple IDs to appleid.apple.com, where they can do the following:

- Find out if he or she has an Apple ID
- Reset his or her Apple ID password
- Manage the information associated with his or her Apple ID

If a user has any of the following services, he or she already has an Apple ID and should not create a new one.

- Apple Developer programs
- Apple Music
- Apple Online Store
- Apple Retail services and programs
- Apple Store app
- Apple Support Communities
- Apple TV
- App Store
- Find My Friends
- Find My iPhone
- Game Center
- iBooks Store
- iCloud
- iMessage
- iTunes Genius
- iTunes Home Sharing
- iTunes Match
- iTunes Radio
- iTunes Store
- iTunes U
- Jobs at Apple
- Mac App Store
- My Apple ID
- My Support Profile
- Photo Print Products
- Volume Purchase Program

Note: Apple IDs cannot be merged. The user's preferred Apple ID should be used. Purchased items such as music, movies, or software using your other Apple IDs are still accessible. Refer to article HT204053: Sign in with your Apple ID to learn more about using two different Apple IDs for iCloud and iTunes.

Accessories

Accessories included with iPhone 7 and 7 Plus:

- 5W USB Power Adapter
- EarPods with Lightning Connector
- Lightning to 3.5 mm Headphone Jack Adapter
- Lightning to Micro USB Adapter (Some countries)
- Lightning to USB Cable (1m)

Accessories included with iPhone 6, 6 Plus, 6s, and 6s Plus:

- 5W USB Power Adapter
- EarPods with 3.5 mm Headphone Plug
- Lightning to Micro USB Adapter (Some countries)
- Lightning to USB Cable (1m)

Additional accessories (not included):

- Lightning to USB Cable (0.5m)
- Lightning to USB Cable (2m)
- Lightning to 30-pin Adapter
- Lightning to 30-pin Adapter (0.2m)
- Lightning Digital AV Adapter
- Lightning to VGA Adapter
- Lightning to SD Card Camera Reader
- Lightning to USB Camera Adapter
- Lightning to USB 3 Camera Adapter
- iPhone Lightning Dock
- Leather Case*
- Silicone Case*
- iPhone 6s Smart Battery Case
- iPhone 7 Smart Battery Case
- AirPods

***Service Strategy for Leather and Silicone Cases:** Leather and silicone cases are available as out-of-warranty service parts. To identify conditions which may affect warranty coverage, refer to article SM268: Visual/Mechanical Inspection (VMI) Guide for Apple Cases and Covers.

5W USB Power Adapter

- Ultracompact design
- Fast, efficient charging

EarPods

- Built-in remote to adjust volume, control music and video playback, and answer or end calls
- Designed to rest comfortably inside a variety of ear sizes
- Speakers inside are designed to minimize sound loss and maximize sound output

Lightning to USB Cable

- USB 2.0
- Connects iPhone, iPad, or iPod (with Lightning connector) to a computer's USB port to sync and charge, or to a USB Power Adapter to charge from a wall outlet
- Reversible design

Lightning to 3.5 mm Headphone Jack Adapter

- Connect devices that use a 3.5 mm audio plug to a Lightning device
- Supports analog audio output
- Compatible with iPhone 5 and later, running iOS 10 or later

Lightning to Micro USB Adapter

- Connects devices with a Lightning connector to micro USB cables and chargers to sync and charge your device

Lightning to 30-pin Adapter

- Connects devices with a Lightning connector to many 30-pin accessories*
- Supports analog audio output and USB audio, as well as syncing and charging
- Video output is not supported

*Some 30-pin accessories are not supported

Lightning to 30-pin Adapter (0.2m)

- Connects devices with a Lightning connector to many 30-pin accessories*
- Supports analog audio output and USB audio, as well as syncing and charging
- Video output is not supported

*Some 30-pin accessories are not supported

Lightning Digital AV Adapter

- Supports mirroring of a device’s screen to a HDMI-equipped TV, display, projector, or other compatible display in up to 1080p HD
- Requires a HDMI cable (sold separately) for connection to a TV or projector
- Supports both video and audio output

Lightning to VGA Adapter

- Supports mirroring of a device’s screen to a VGA-equipped TV, display, projector, or other compatible display in up to 1080p HD
- Requires a VGA cable (sold separately) for connection to a TV or projector
- Does not support audio output

Lightning to SD Card Camera Reader

- Downloads photos and videos from a digital camera
- Supports standard photo formats, including JPEG and RAW, along with SD and HD video formats, including H.264 and MPEG-4
- Compatible with iPhone 5 and later

Lightning to USB Camera Adapter

- Downloads photos and videos from a digital camera
- Supports standard photo formats, including JPEG and RAW, along with SD and HD video formats, including H.264 and MPEG-4
- Compatible with iPhone 5 and later

Lightning to USB 3 Camera Adapter

- Downloads photos and videos from a digital camera
- Supports standard photo formats, including JPEG and RAW, along with SD and HD video formats, including H.264 and MPEG-4
- Compatible with iPhone 5 and later
  Note: The Lightning to USB 3 Camera Adapter transfers data at USB 3 speeds when connected to an iPad Pro 12.9-inch. All other iOS devices transfer at USB 2 speeds.

iPhone Lightning Dock

- Connects iPhone to a computer to sync and charge, or to the Apple USB Power Adapter to charge from a wall outlet using a Lightning to USB Cable
- 3.5 mm audio port, supports headphones with remote control or line-out
- Available in a variety of colors
- Compatible with iPhone 5 and later

Leather Case

- Leather exterior with soft microfiber lining
- Available in two sizes and a variety of colors

Silicone Case

- Silicone exterior with soft microfiber lining
- Available in two sizes and a variety of colors

AirPods - Overview and Visual/Mechanical Inspection (VMI) Guide

This article contains the following sections

Overview

AirPods

- Automatically on, automatically connected
- One-tap setup for all your Apple devices
- Control music and video playback
- Answer and end calls
- Compatible with:
  - iPhone, iPad, and iPod touch models with iOS 10 or later
  - Apple Watch models with watchOS 3 or later
  - Mac models with macOS Sierra or later
- Seamless switching between devices

AirPods Charging Case

- Built-in battery
- Charges AirPods

Service Considerations

When replacing either the left or right AirPod, the new AirPod needs to be connected to the customer's other AirPod. Put both AirPods into the charging case and follow instructions on the screen of the connected iPhone. If a connected iPhone is not available, hold the button on the back of the charging case until the LED flashes amber. This will connect the two AirPods and will also reset them to factory default settings.

Configure AirPods using software settings on the connected iPhone in **Settings > Bluetooth** for the following functions:

- Double-tap
  - Siri
  - Play/Pause
  - Off
- Automatic Ear Detection
  - On/off

- Microphone
  - Automatically Switch AirPods
  - Always Left AirPod
  - Always Right AirPod

Charging case status light colors:

- Flashing white when in setup mode
- Flashing amber when buds in the case are not connected to each other
- Solid amber when charging
- Solid green when fully charged
- Off when the case has been plugged in to a power adapter for longer than six hours

AirPods Charging Case Button Functions

- Hold the button until LED flashes white to enter discovery mode and pair to a new device.
- The case is required to set up AirPods. Hold the button on the back until LED flashes white.
- The case is required to restore AirPods to factory default settings. Hold the button on the back until LED flashes amber.

Functional Test

Test Pairing and Bluetooth

1. Setup AirPods to a known-good device. Press and hold the button on charging case until the LED flashes white, then hold close to a known-good device. Follow onscreen instructions.
2. Check in **Settings > Bluetooth** to verify AirPods are connected. **Note:** The charging case should be open or one or both AirPods should be out of the case.
3. Place AirPods in ears.
4. Play music to verify proper audio routing.

Test Touch Gesture

1. Double-tap either AirPod to access Siri. **Note:** Check the double-tap settings on the connected iPhone in **Settings > Bluetooth**.

Test Sound Quality

1. Listen to music for sound quality.
2. Set microphone to Always Left AirPod in **Settings > Bluetooth**.
3. Make a test phone call to an approved toll-free number. During the call, verify the sound quality of the receiver and the microphone.
4. Set microphone to Always Right AirPod and repeat step 3.

Test Charging

1. Place both AirPods in the charging case.
2. Connect a Lightning cable to the charging case. Connect the other end of the Lightning cable to a USB power adapter or the USB port on a computer.
3. Verify that the LED on the charging case turns solid amber (or solid green, if case and AirPods are both already fully charged).

Visual/Mechanical Inspection

Device Wear

The warranty does not apply to cosmetic damage (including, but not limited to, scratches, dents, and broken plastic on ports), or to defects caused by normal wear and tear or otherwise due to the normal aging of the device. If no hardware issue is present and cosmetic damage is the only reported issue, then deny a repair or replacement.

Examples of wear:

- Discoloration and/or staining
- Cracks, marks, or scratches

Service Eligibility Guidelines

The chart below outlines the service eligibility of different types of damage.

Eligible for Warranty Service	If the damage for which the user is seeking service is described below, then the device is eligible for warranty service. If the AirPods also have accidental or liquid damage, then a whole-unit replacement should be performed under warranty. • Swollen battery: Including deformation or case separation due to a swollen battery.
Eligible for Out-Of-Warranty Service (Returnable Damage)	If the damage (or combination of damages) for which the user is seeking service is described below, then the device is eligible for out-of-warranty service. • Damaged Lightning connector: Foreign material that cannot be removed, including broken accessories, bent pins, broken plastic, or a bent bezel.
Ineligible for Service (Nonreturnable Damage)	If the damage for which the user is seeking service is described below, then the device is ineligible for service. Return the device to the user. • Disassembled unit or missing parts: To receive service, the unit must have all functional parts and must be assembled. • Catastrophic damage: Includes units that are destroyed or forcibly separated into multiple pieces. • Counterfeit parts; damage caused by counterfeit parts, third-party parts, or unauthorized modifications: Damage caused by unauthorized modifications is ineligible for warranty or out-of-warranty service.

Troubleshooting Symptom Charts

Accessories

- Accessory Issues
- Missing or Lost Audio Accessory

Connectivity

- Control Issues
- Wireless Connection Issues

Mechanical

- Physical Damage Issues
- Unusual Heat or Odor

Power

- Power Issues

Sound

- Microphone Issues
- Sound Issues

Additional Resources

iPhone Product Page
iPhone features and technology.
www.apple.com/iphone

iPhone Support Page
Information, guides, assistants, and troubleshooting tips.
www.apple.com/support/iphone

iPhone Tech Specs
System requirements, supported languages, media formats, and technical details.
support.apple.com/specs/iphone

iPhone User Guide
Easy to access, in-depth usage instructions for features and settings.
support.apple.com/manuals/iphone

iTunes Support Page
www.apple.com/support/itunes

Apple Batteries
www.apple.com/batteries

Micro-Inspection Procedure

Perform Visual/Mechanical Inspection (VMI) before Micro-Inspection.

Do not perform Micro-Inspection for mail-in repairs, except when the externally-visible liquid contact indicator is triggered, damaged, or missing.
For non mail-in repairs, perform Micro-Inspection when an iPhone 7 Plus does not turn on.

The examples below are intended to be a guide. Do not limit inspections to only the areas shown. Use them to assist in the inspection of the whole device for unauthorized modifications. Inspect the entire iPhone and document all signs of modification.

Unauthorized modifications may include:

- Cut cables or flexes
- Pierced cables or flexes
- Damaged connectors or components
- Removed connectors or components
- Missing serial numbers
- Compressed or missing springs

Use a USB microscope with 20X–200X magnification, capable of capturing a close-up image of any modified area. **Note:** Component examples shown below.

Important: Unauthorized modifications alter a device's functionality and/or capability.

Note: To process the repair and document a test failure, use part number 011-0659, Micro-Inspection 1.

Inspection Locations

1. Enclosure and markings
2. Camera
3. Upper logic board
4. SIM card reader
5. Lower logic board
6. Dock flex
7. Display assembly
8. Buttons, ringer switch, and flexes
9. Display flexes

Unauthorized Modification Examples:

Enclosure and Markings

The enclosure should have two lines of text.

Known-good enclosure

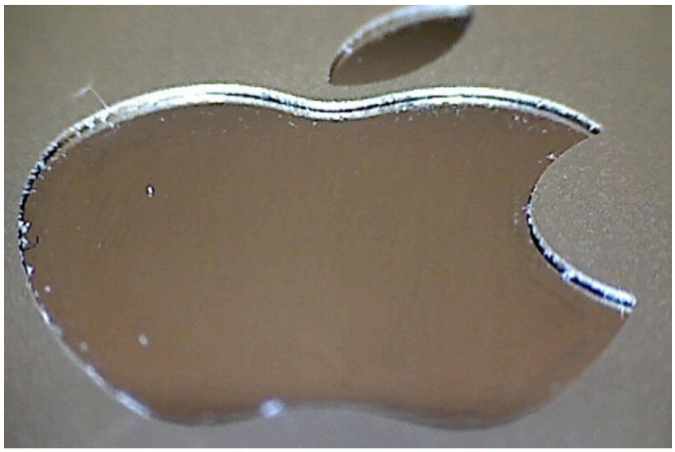
Third-party enclosure

Known-good Apple logo

Apple logo should be flush with the enclosure.

Known-good font

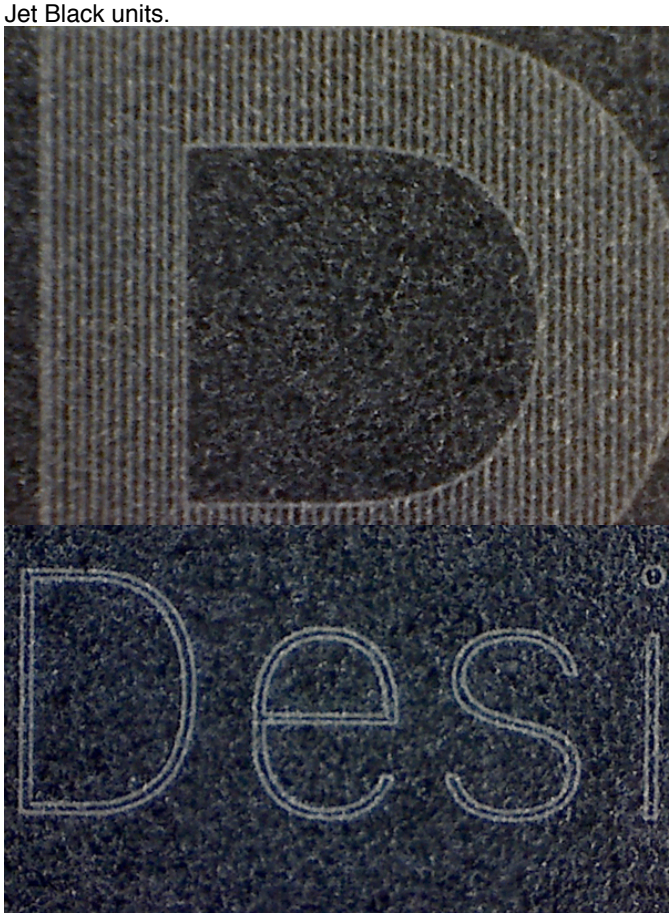
Third-party Apple logo



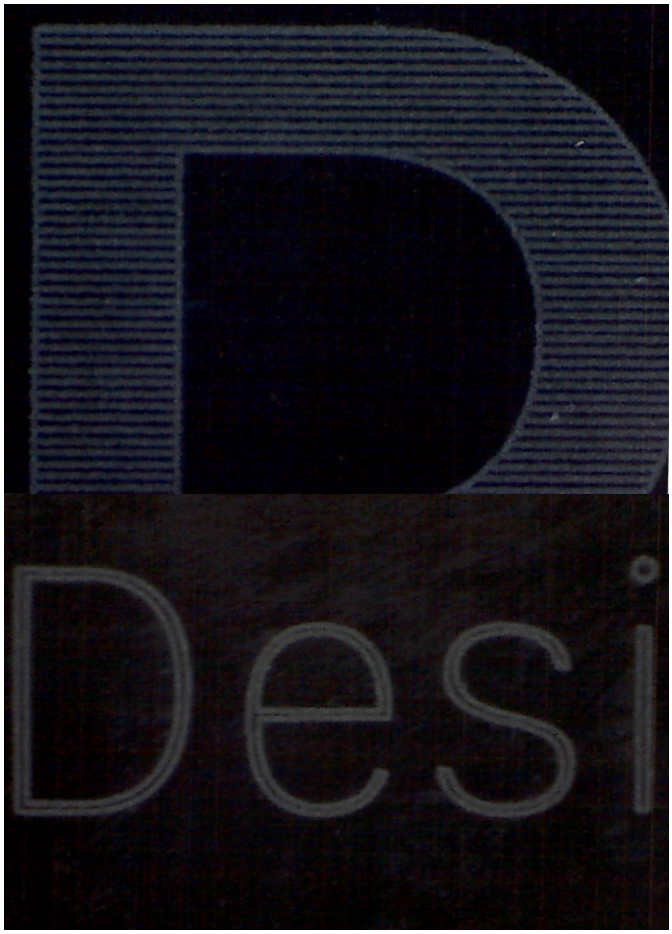
iPhone

Designed by Apple in California Assembled in China
Model A1660 FCC ID: BCG-E3085A IC: 579C-E3085A

Black
Both horizontal or vertical lines are acceptable for Black or Jet Black units.



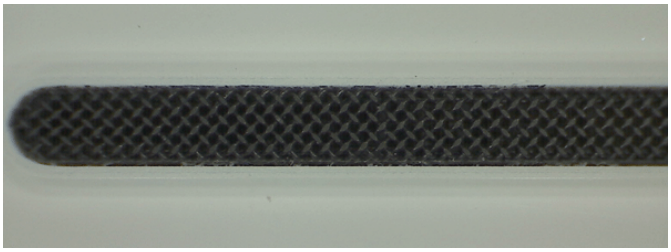
Jet Black
Both horizontal or vertical lines are acceptable for Black or Jet Black units.

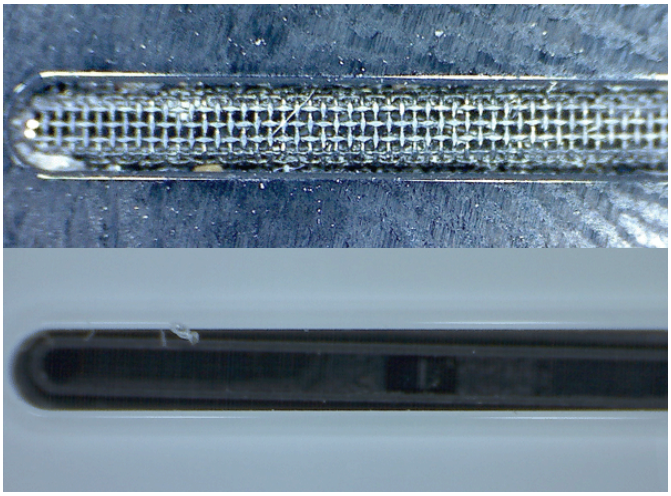


All other colors

Known-good receiver

Damaged receiver

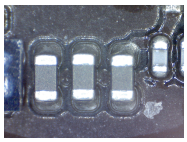




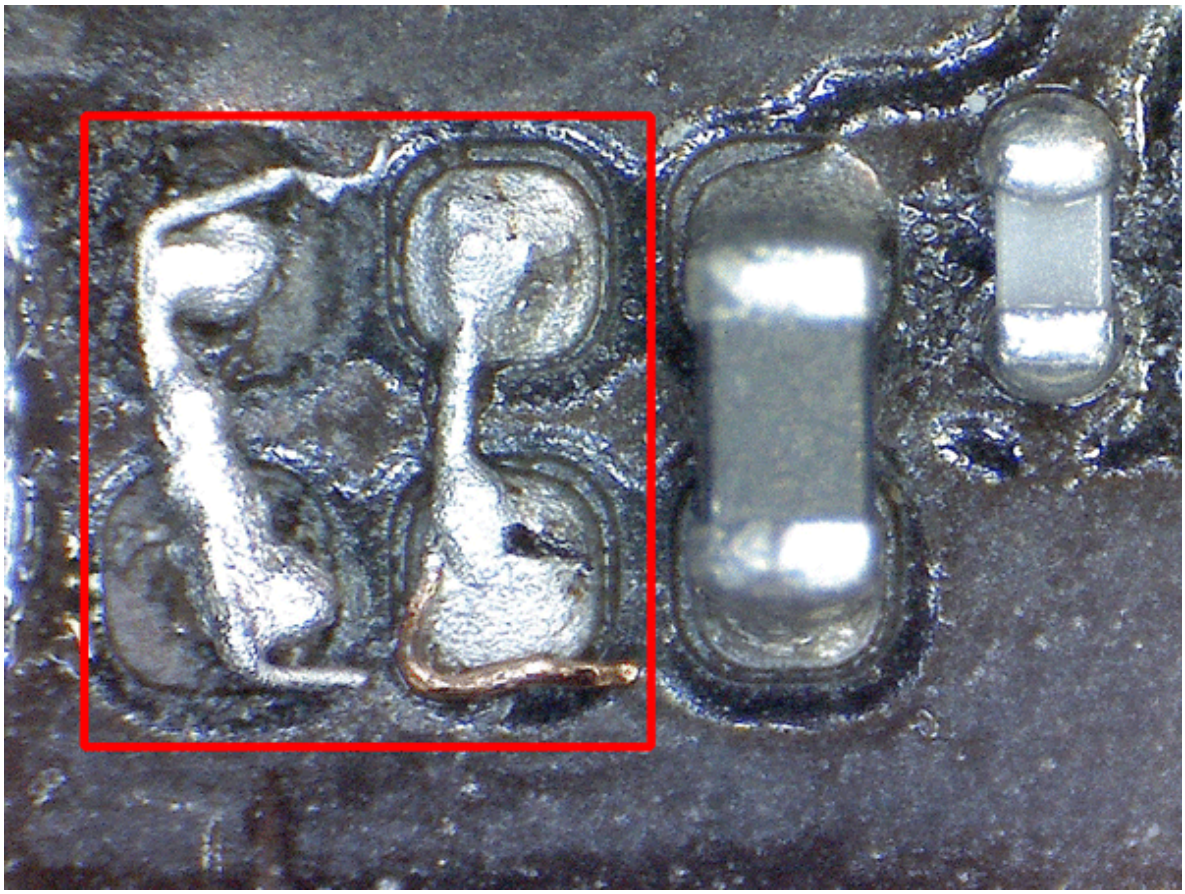
Components

Inspect the entire device for component damage. These images are examples of possible damage to components.

Known-good components

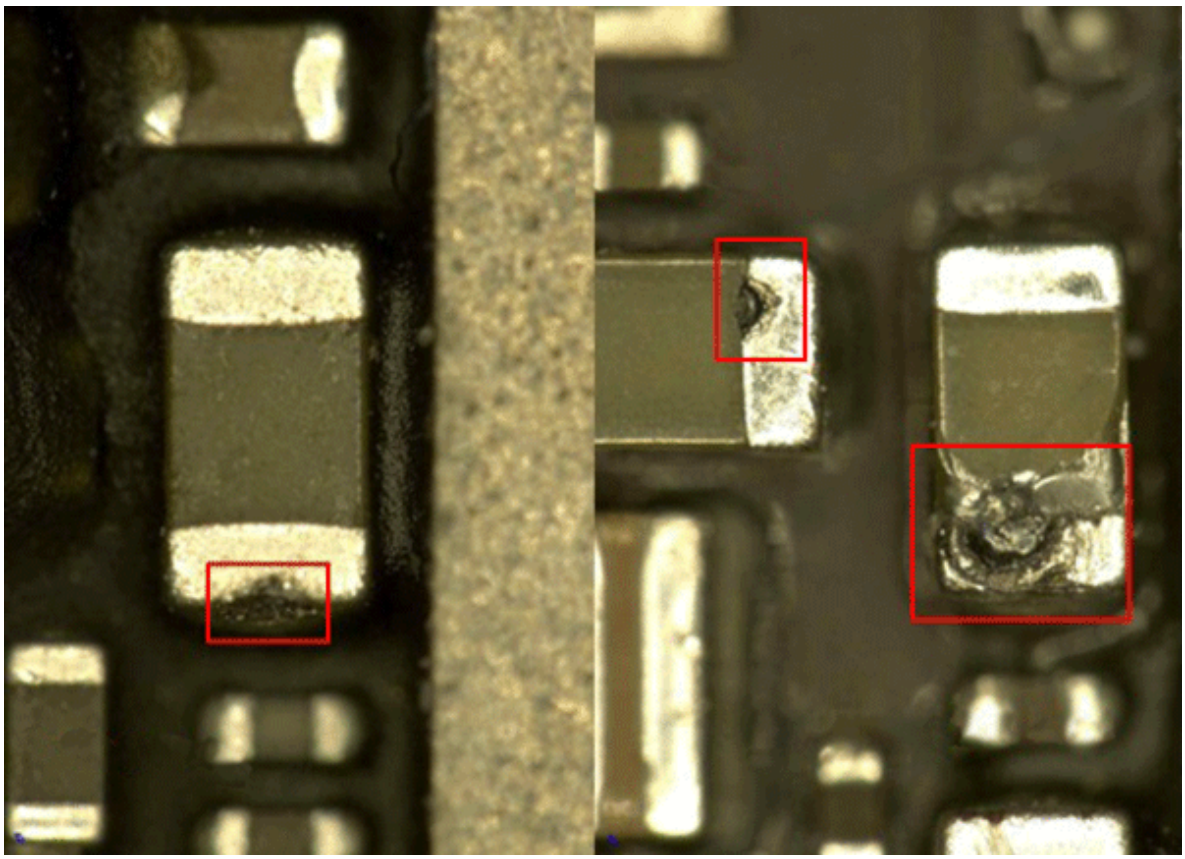


Damaged components

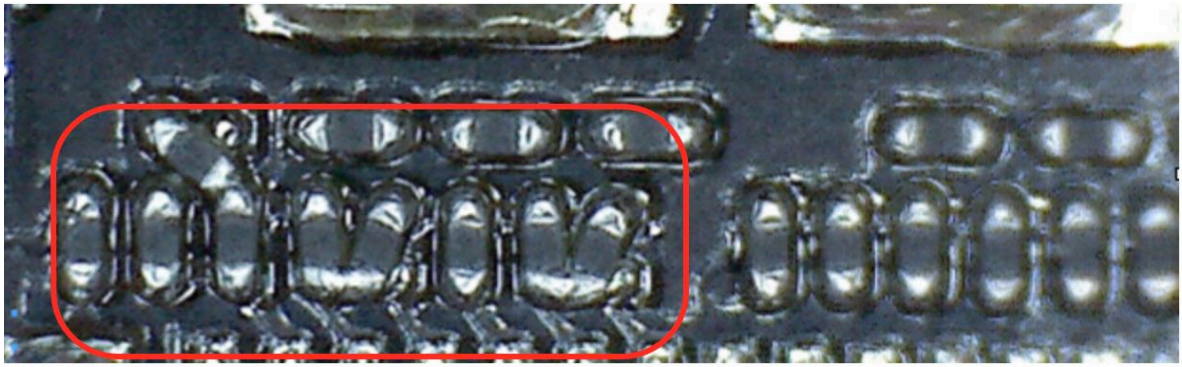


Burnt components

Undamaged components

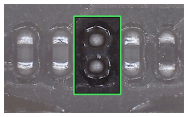


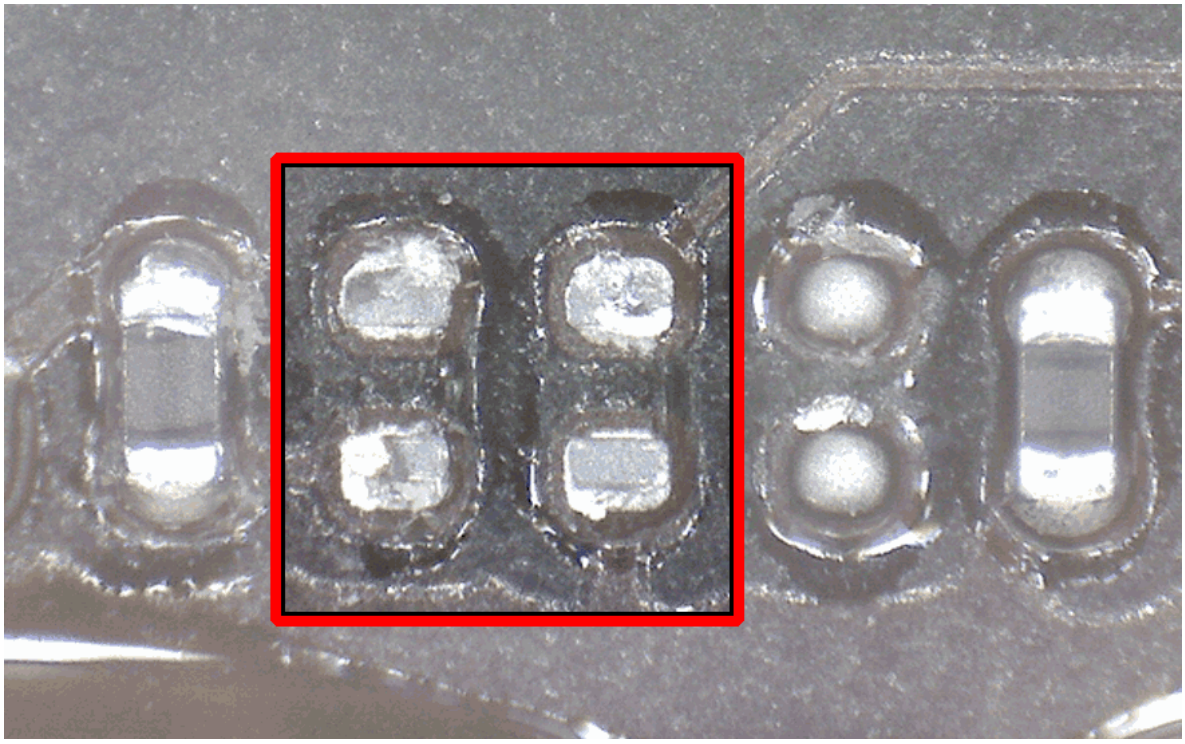
Third-party components with poor soldering



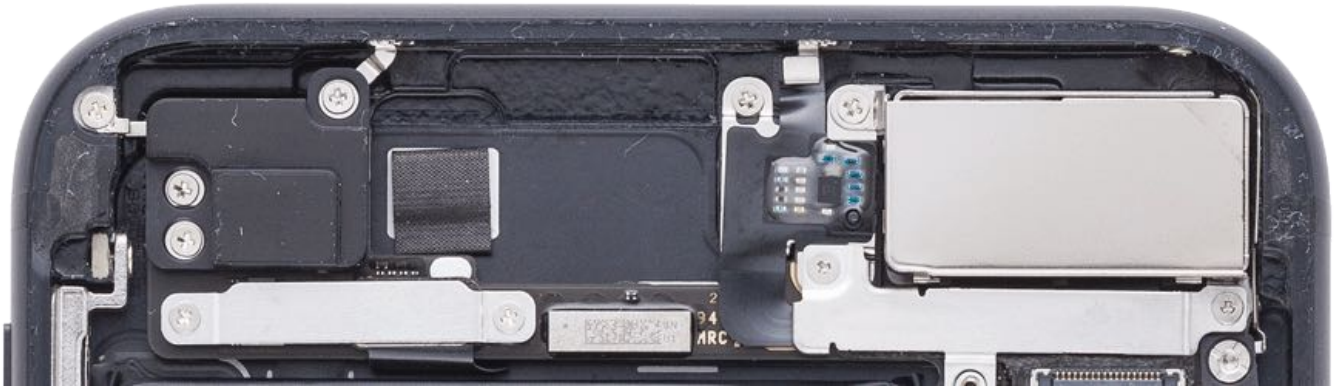
Component not present: When a component is not present due to removal, solder points will be as shown (damaged or forcibly removed).

Component not present: When a component is not present by design, dome-shaped solder points will be present (undamaged).

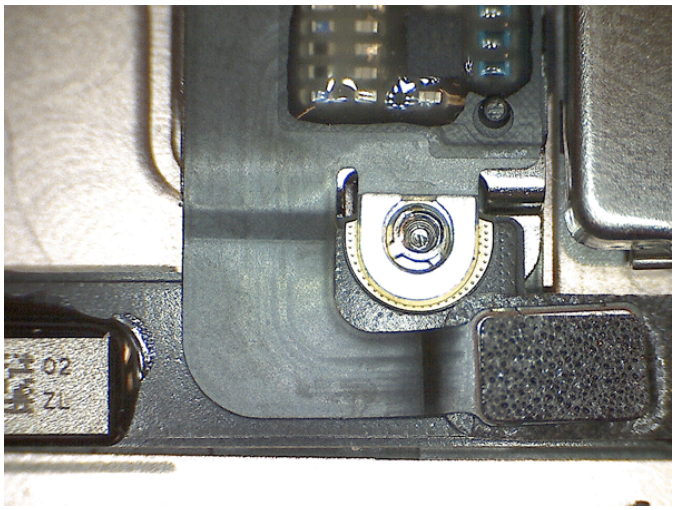




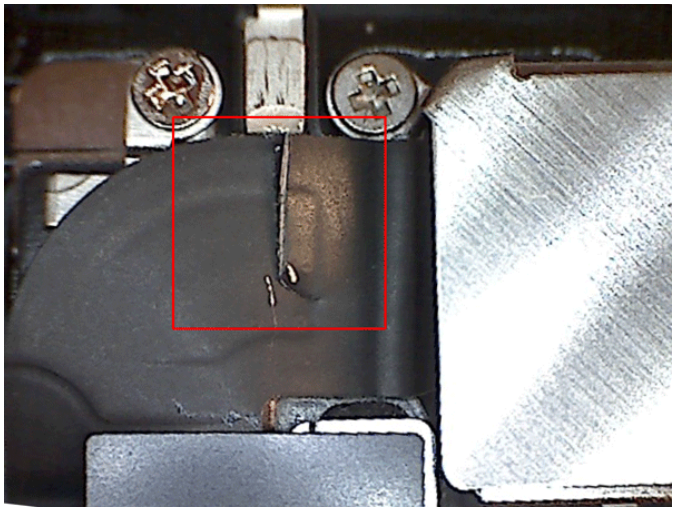
Camera

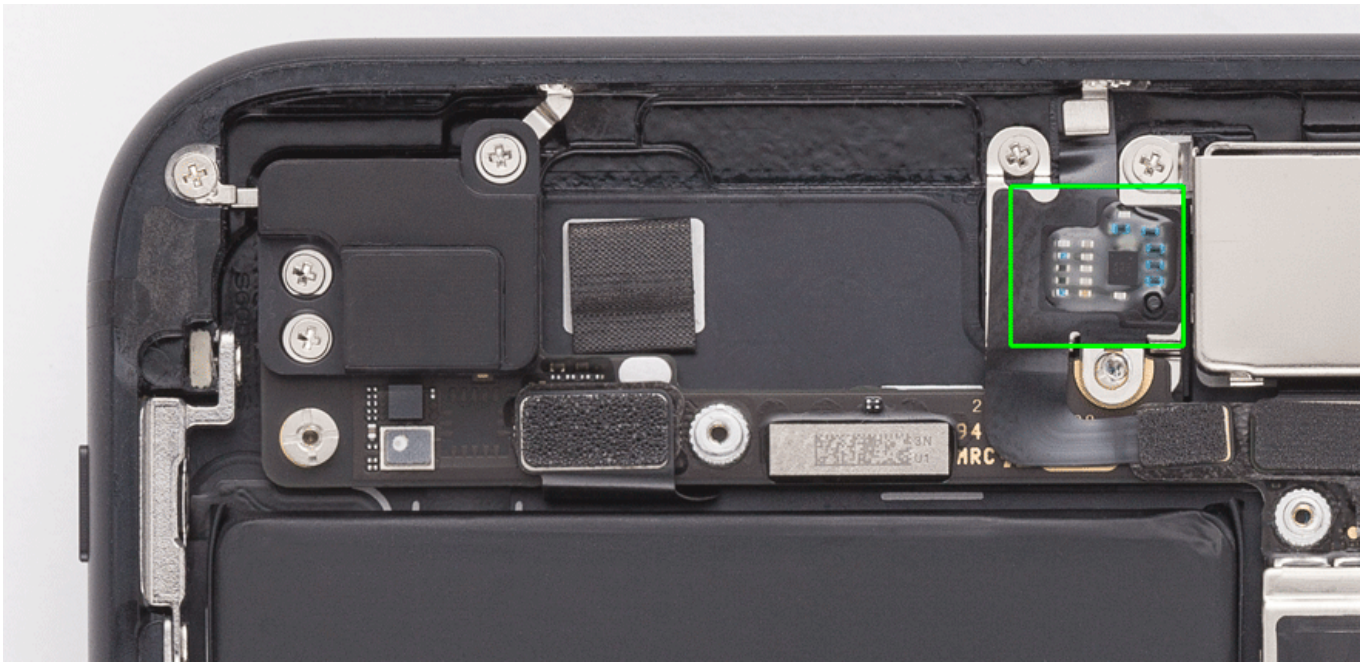


Known-good camera flex

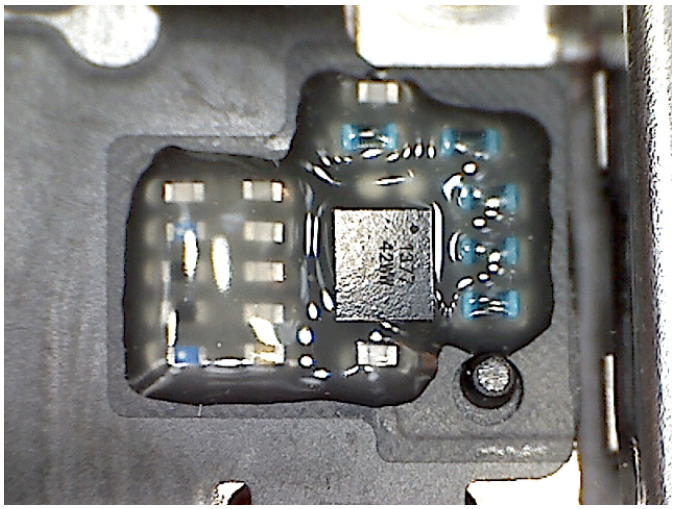


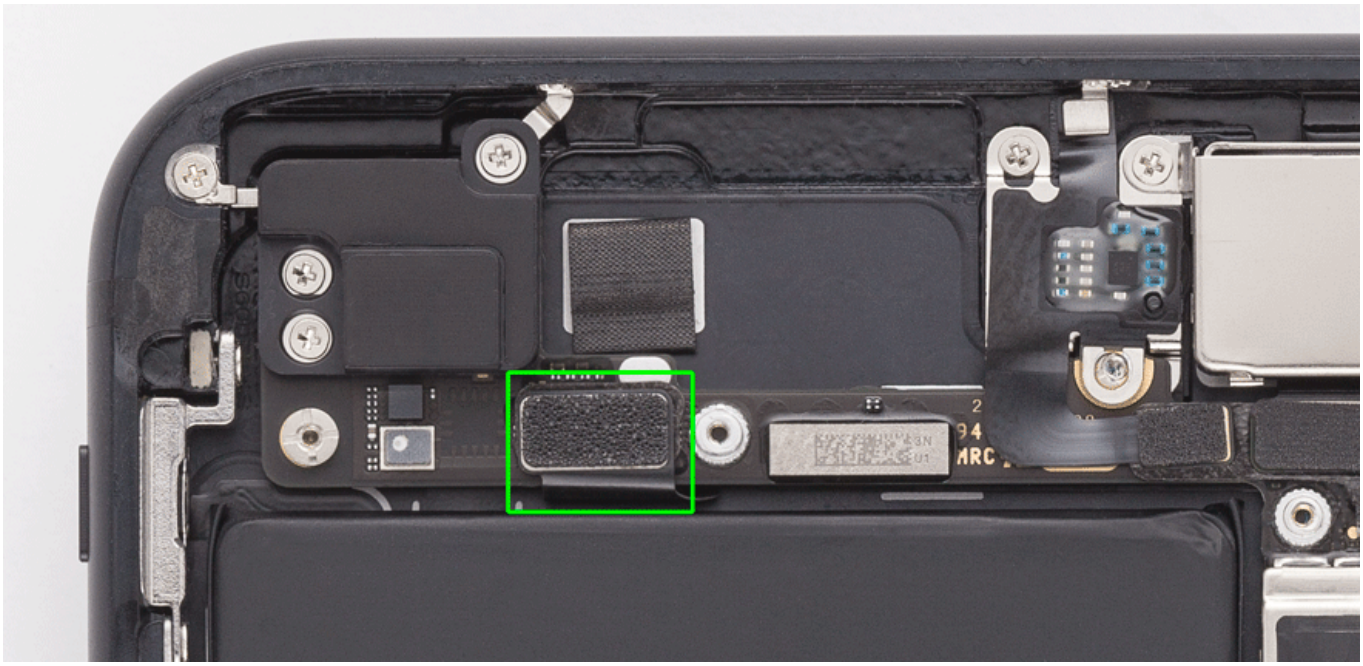
Damaged flex



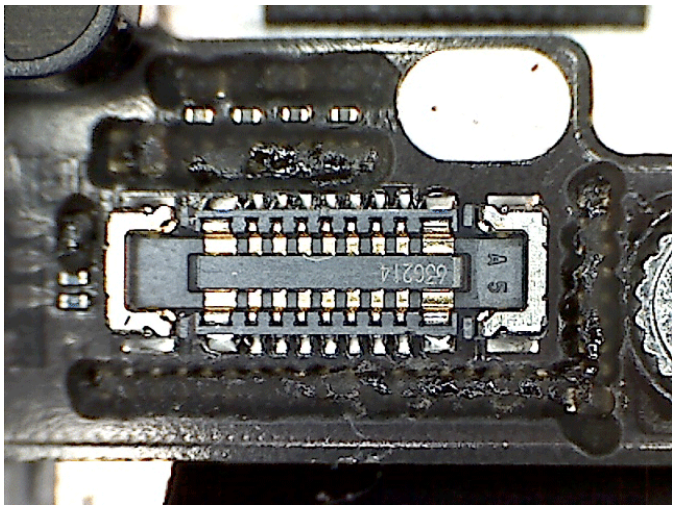


Known-good components under camera flex

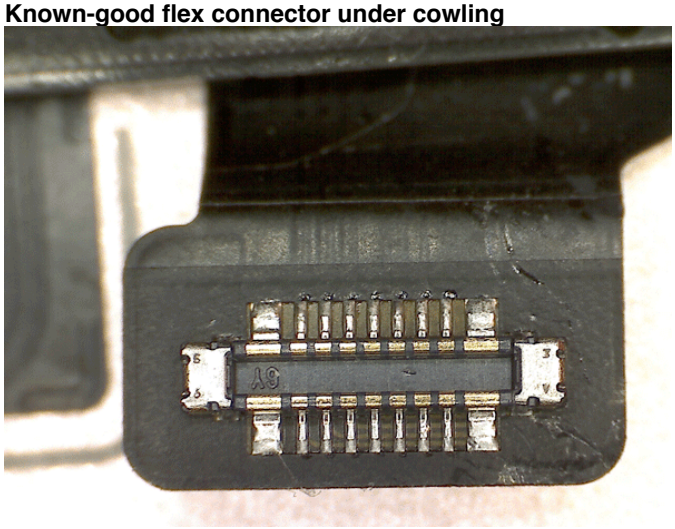




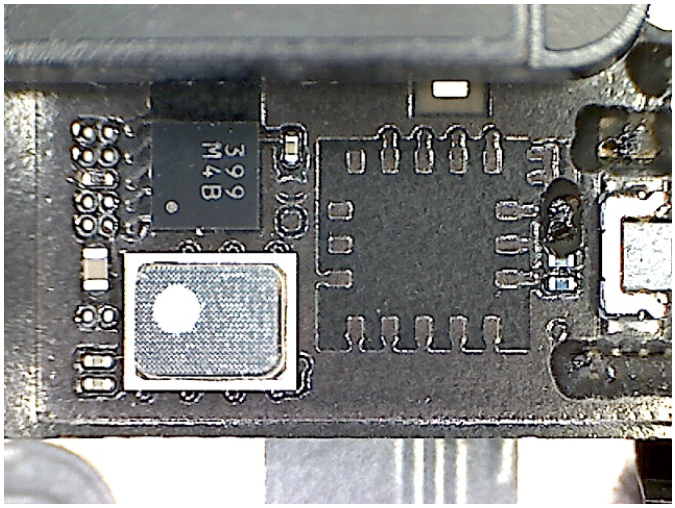
Known-good components and connector under cowling

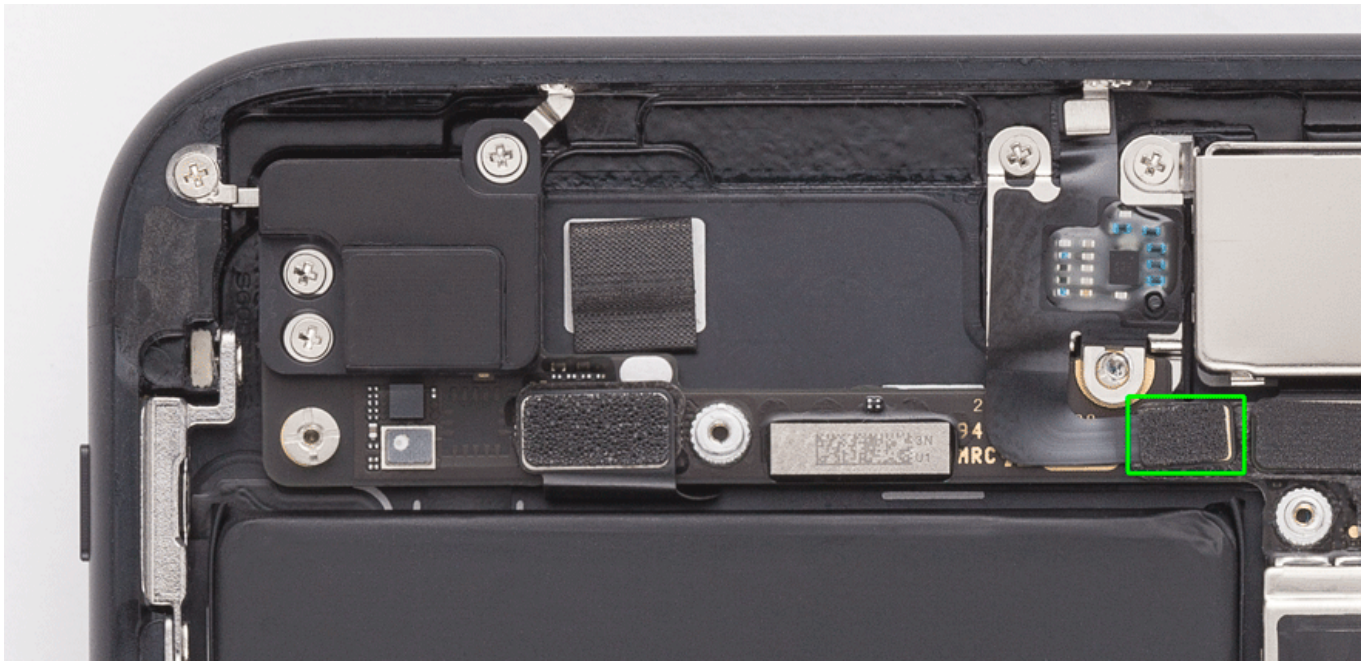


Known-good flex connector under cowling

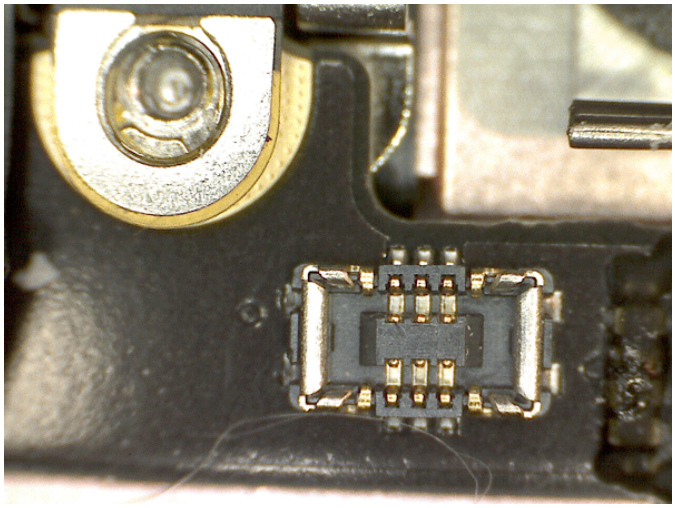


Known-good components

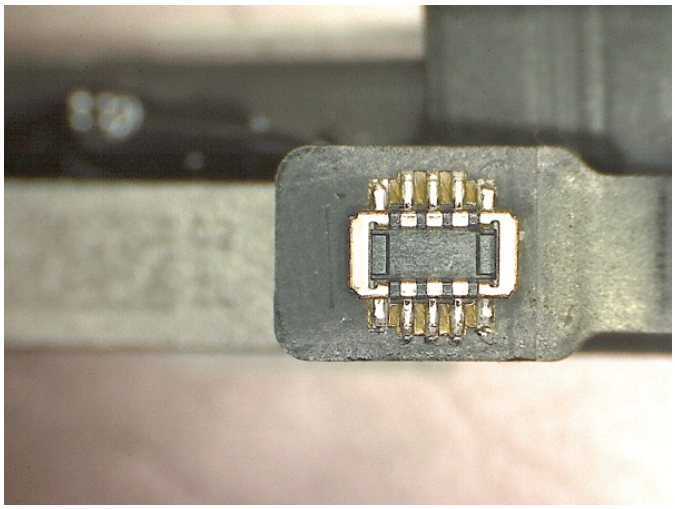




Known-good connector



Known-good connector



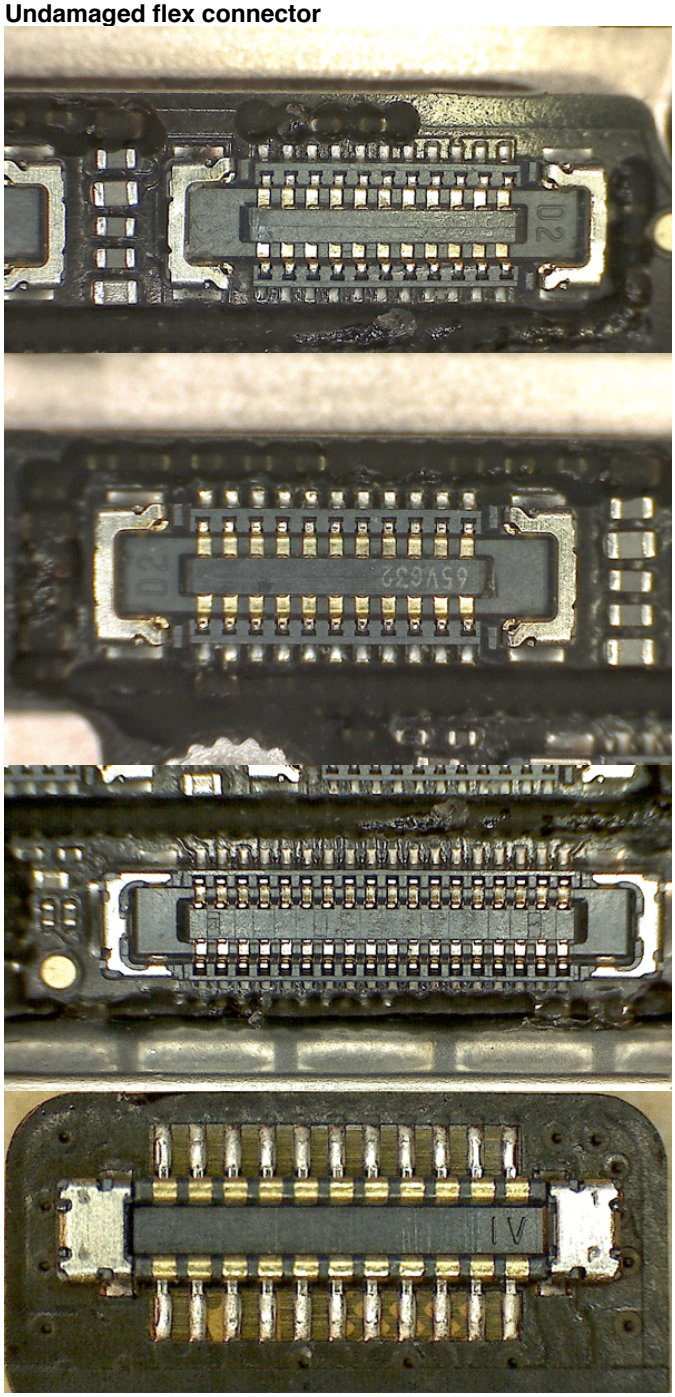
Upper Logic Board

Black mylar tape should be present when the device is opened. Do not remove undamaged mylar tape.

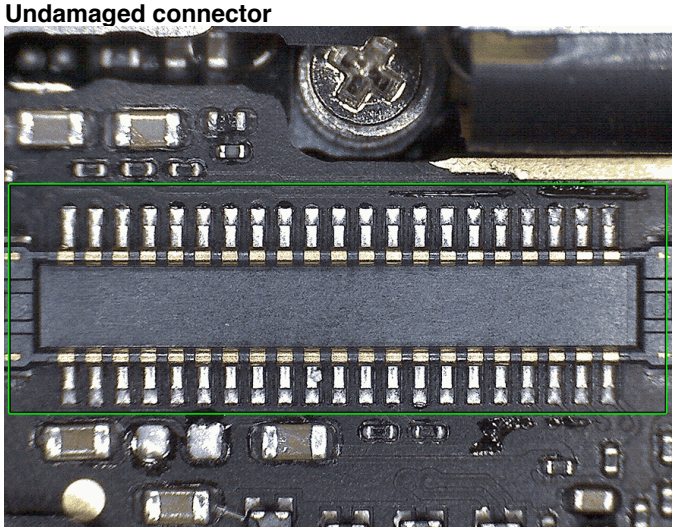
Damaged Connectors

Damaged connectors may have missing pins, a cracked connector frame, or improperly soldered pins. Damaged connectors may also have solder between pins or pads.

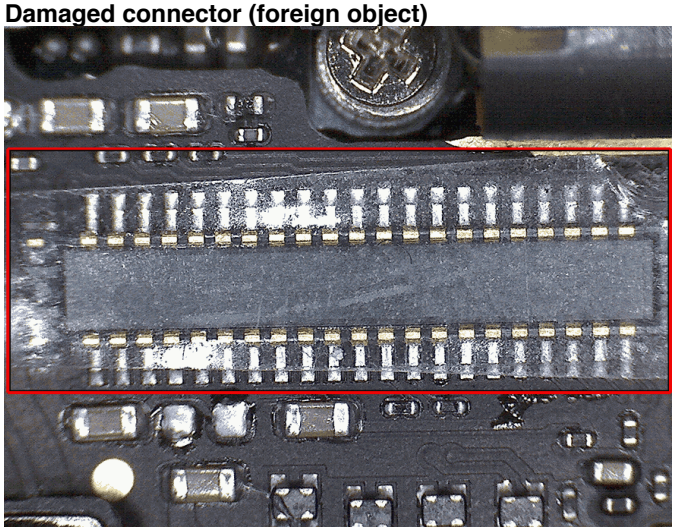
Undamaged flex connector



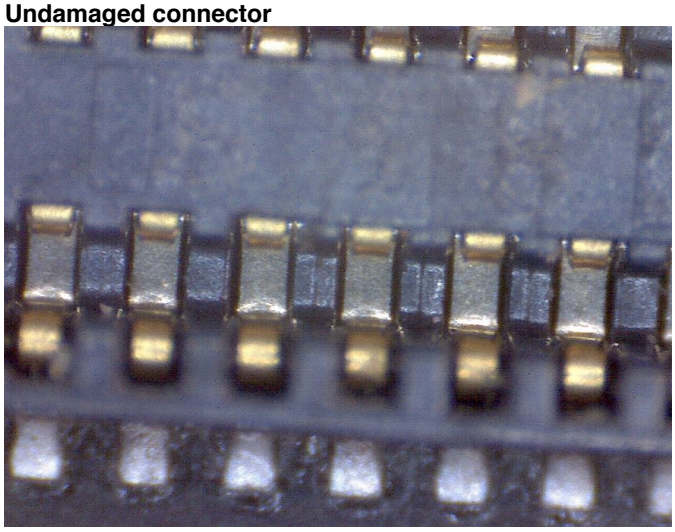
Undamaged connector



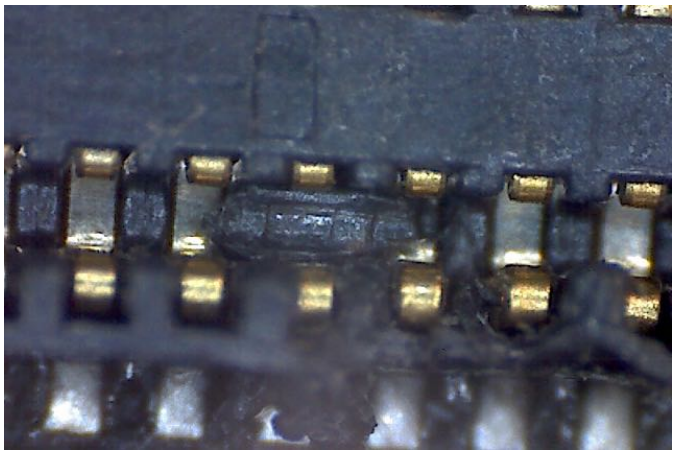
Damaged connector (foreign object)



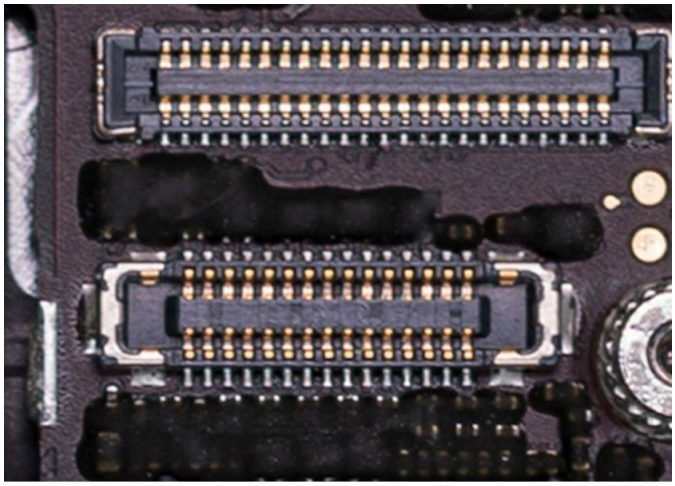
Undamaged connector



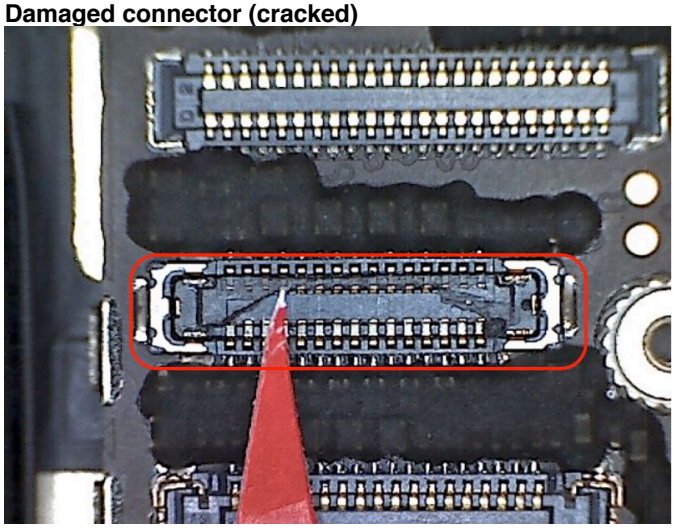
Damaged connector (foreign material)



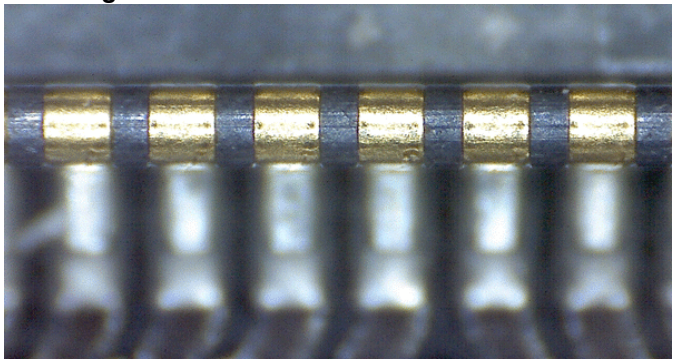
Undamaged connector



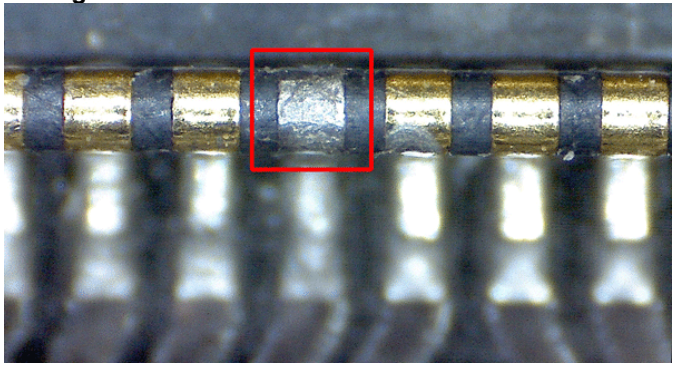
Damaged connector (cracked)



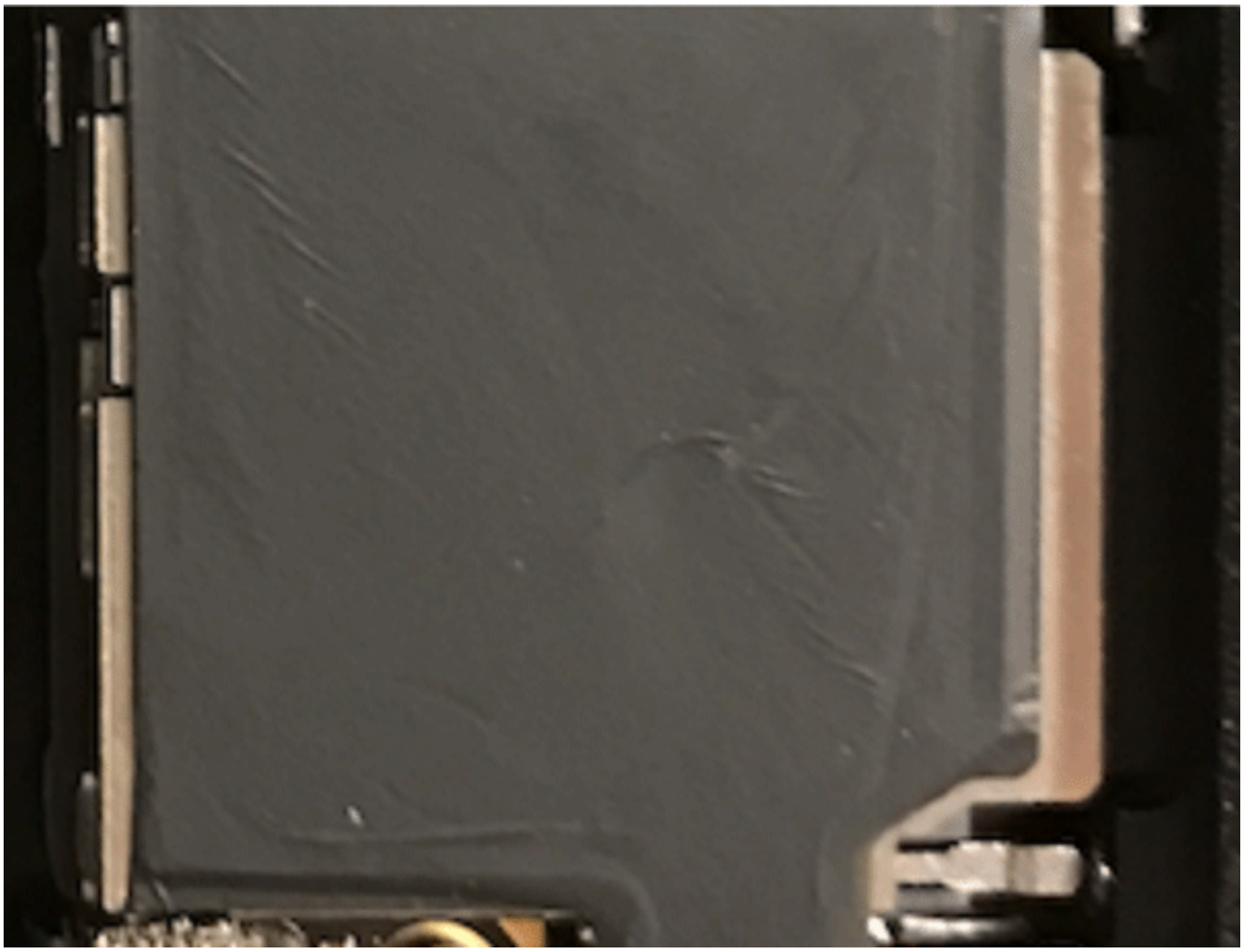
Undamaged connector



Damaged connector

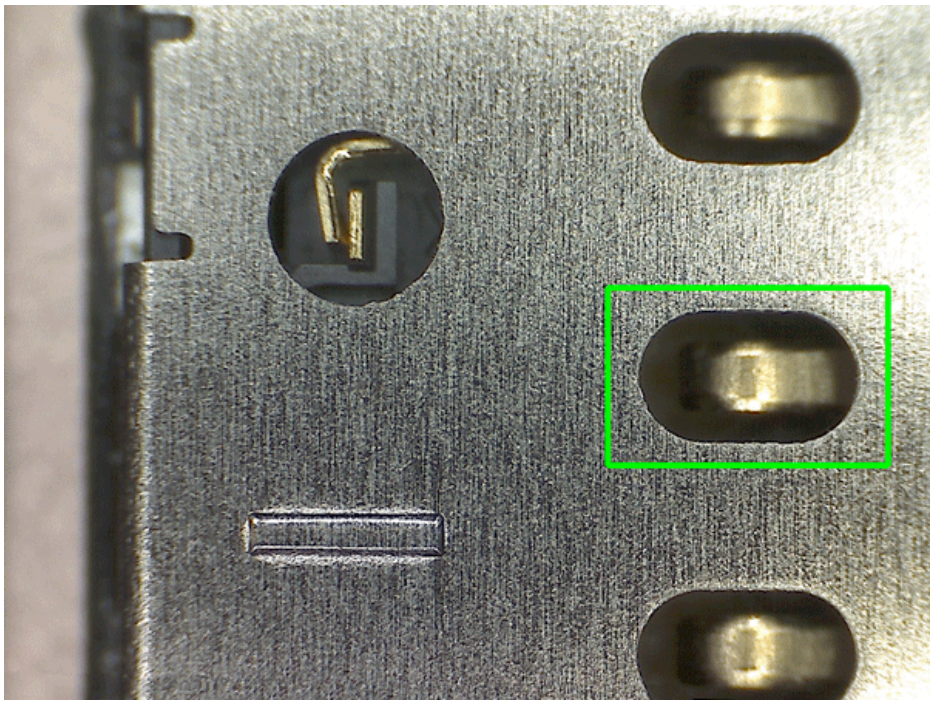


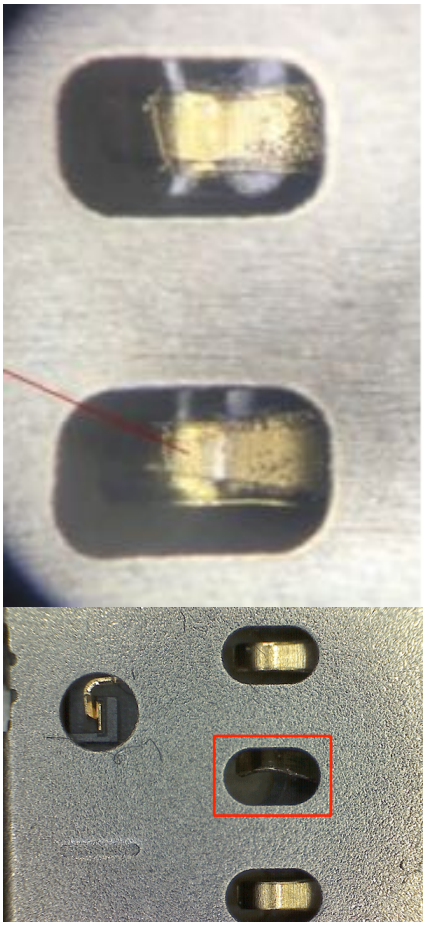
SIM Card Reader
The SIM card reader should be covered with mylar tape. Do not remove the tape if it is undamaged. Perform inspection if mylar tape is missing.



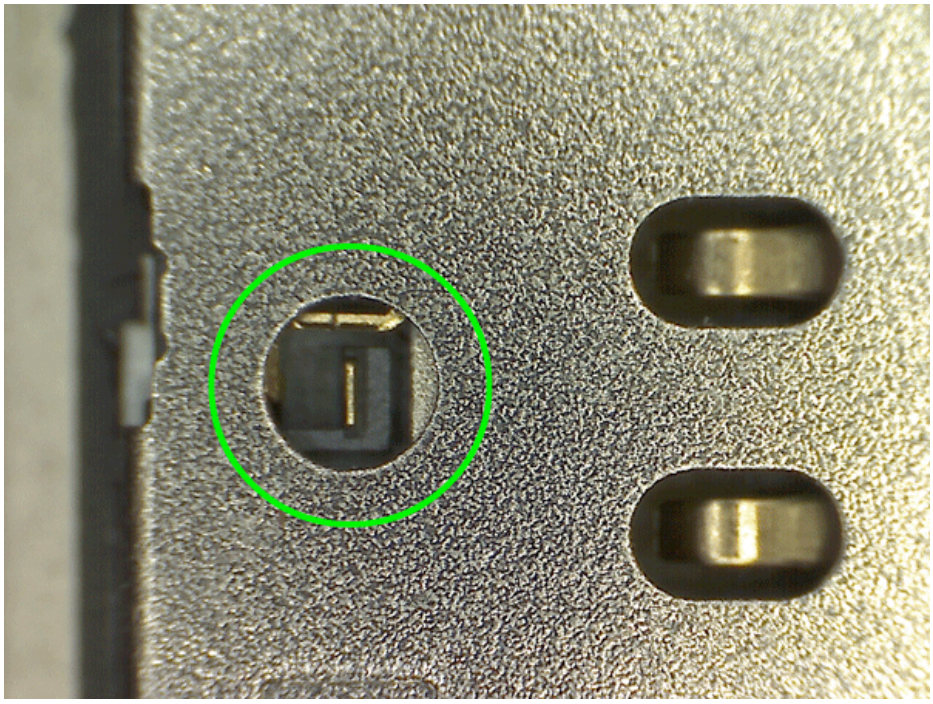
Undamaged SIM card reader pins

Damaged or modified component
Pins covered with foreign material.

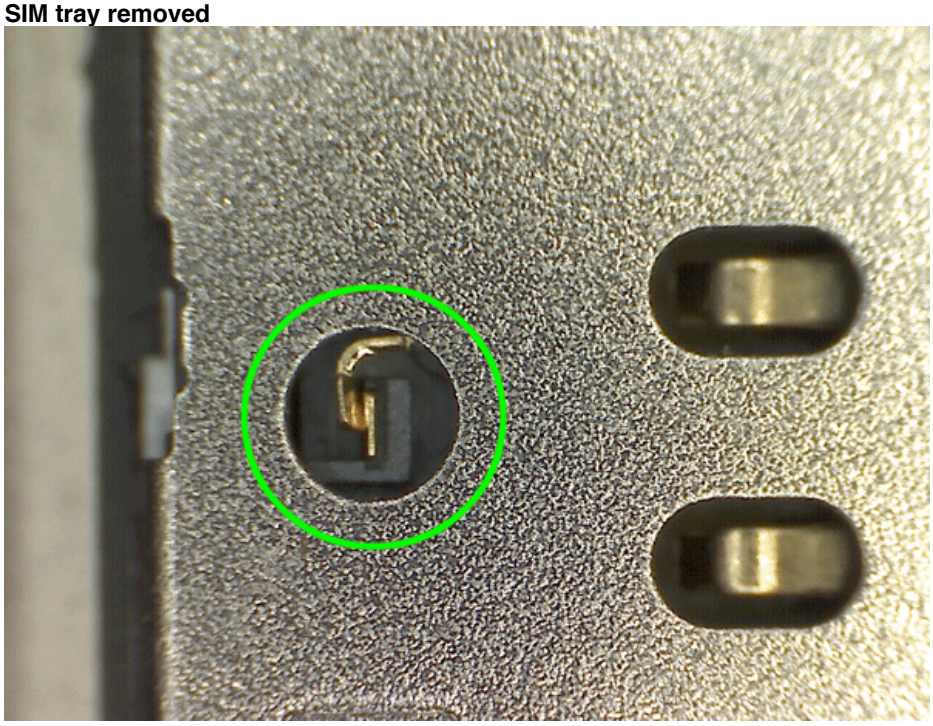




SIM tray inserted

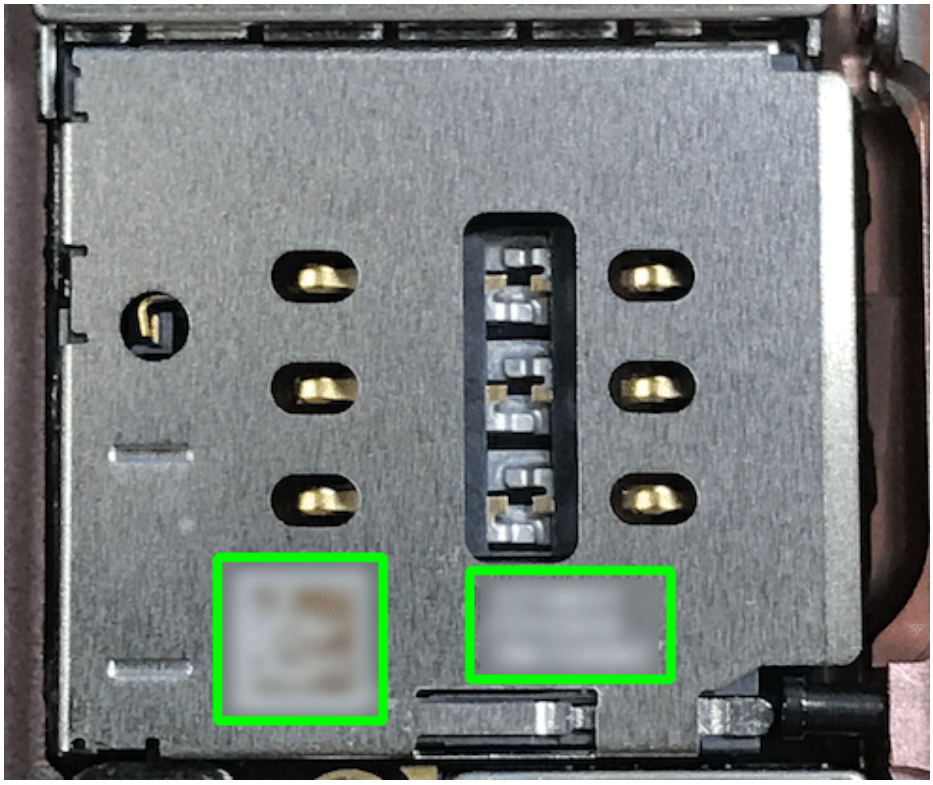


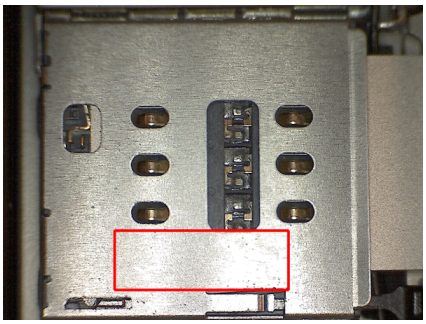
SIM tray removed



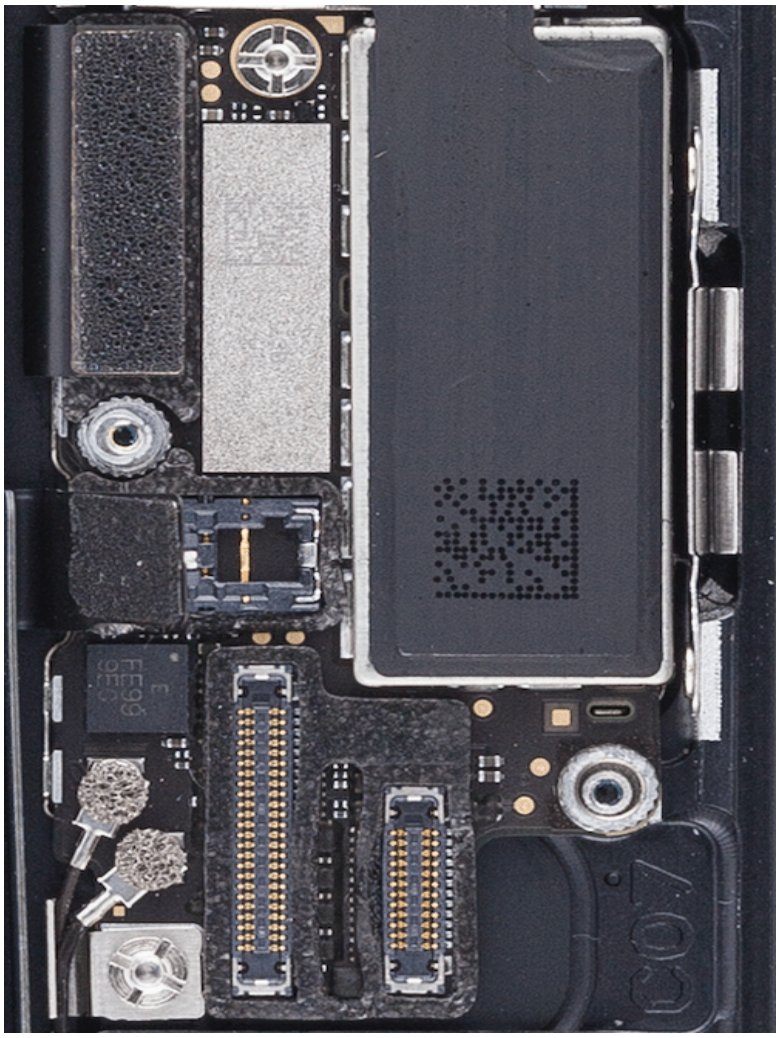
Apple serial number

Damaged or modified serial number

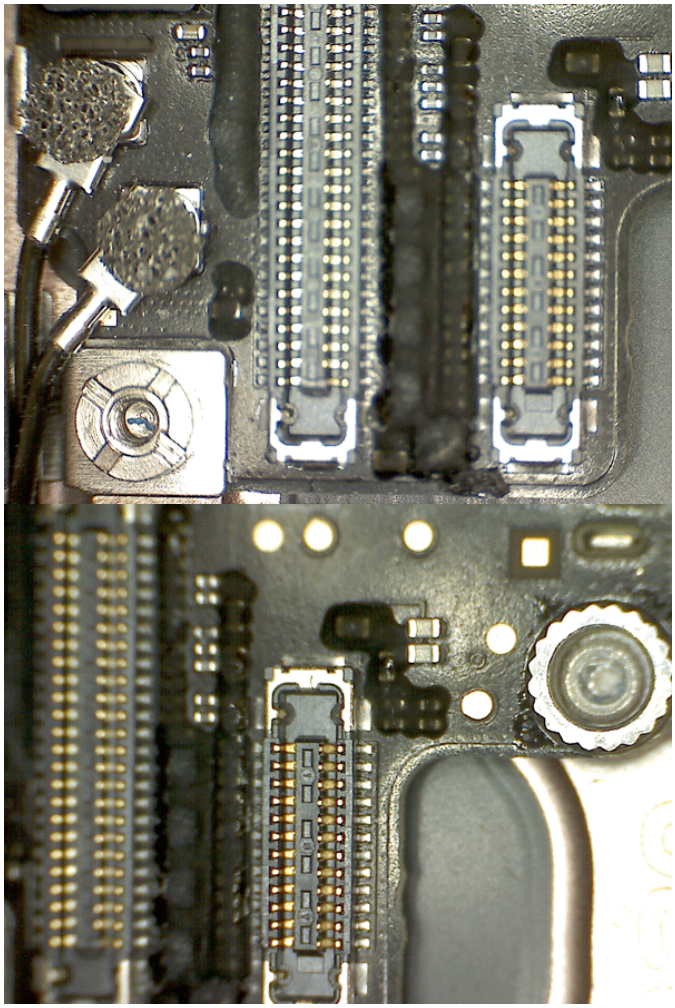




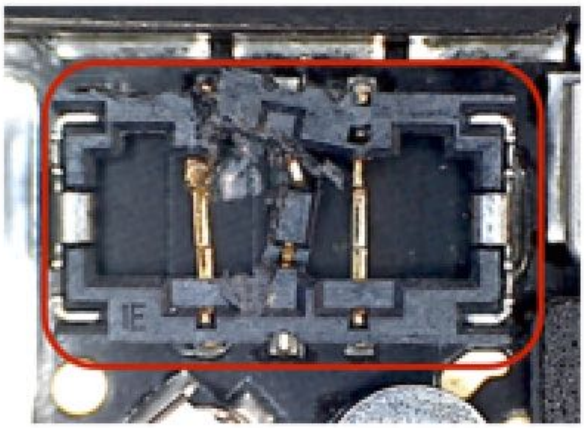
Lower Logic Board



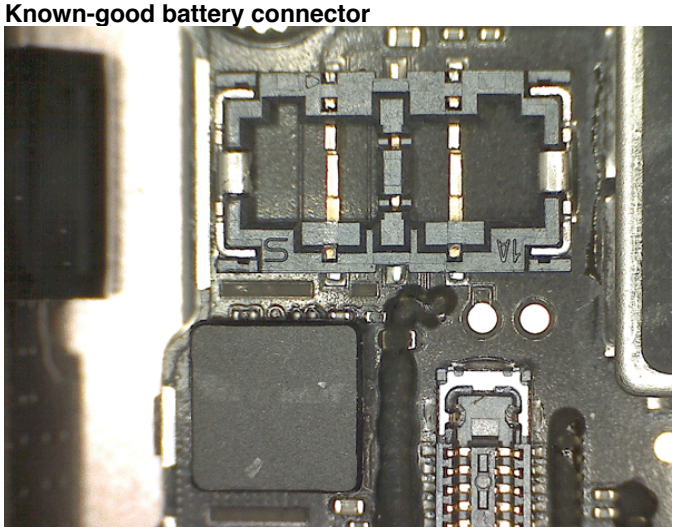
Known-good connector



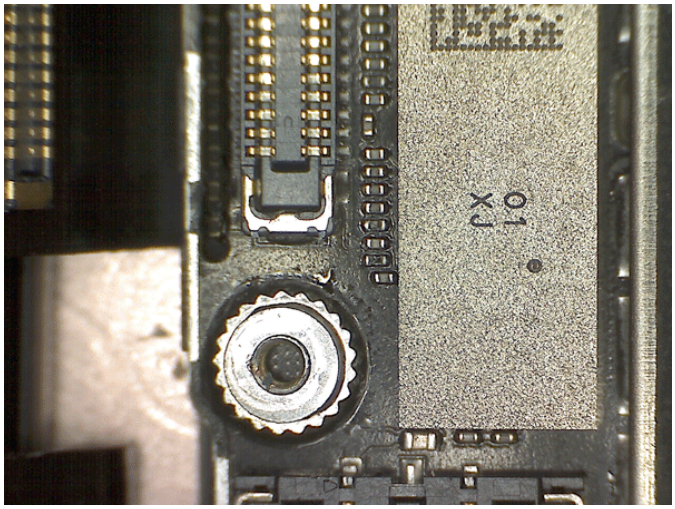
Known-good battery connector



Damaged battery connector

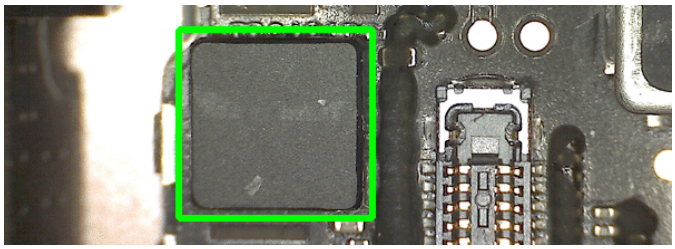


Known-good display connectors



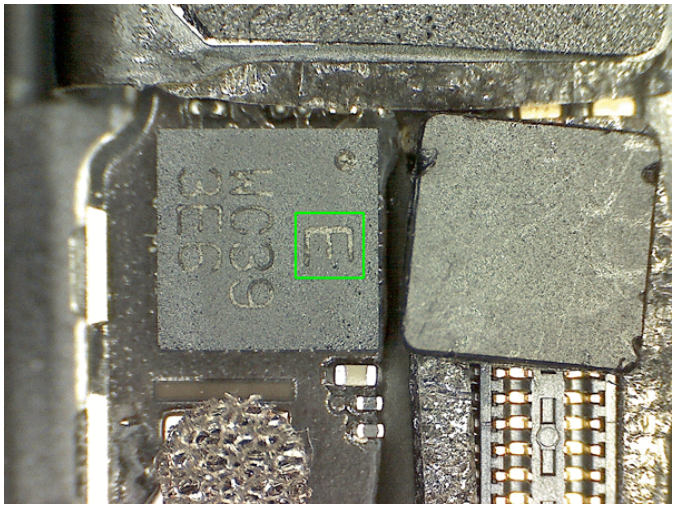
Known-good display component

The components markings should be covered with mylar. If the mylar is missing, loose, or damaged, then inspect the markings to verify the "E" is present. Do not remove the mylar if it is present and undamaged.

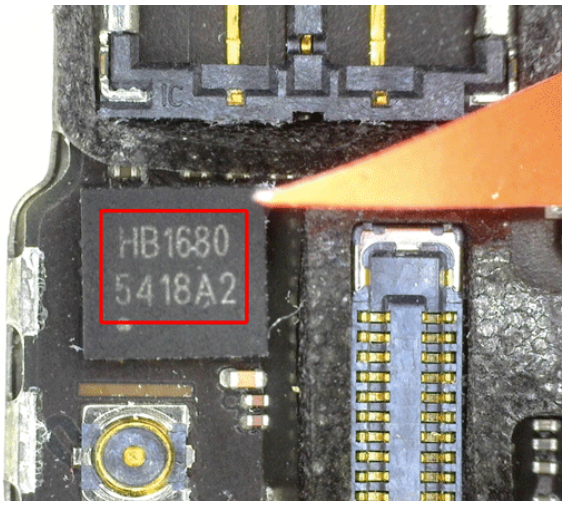


Known-good component

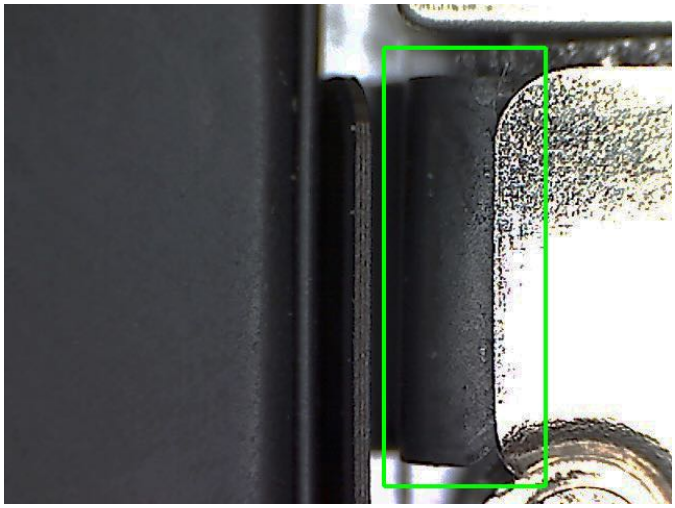
Incorrect component



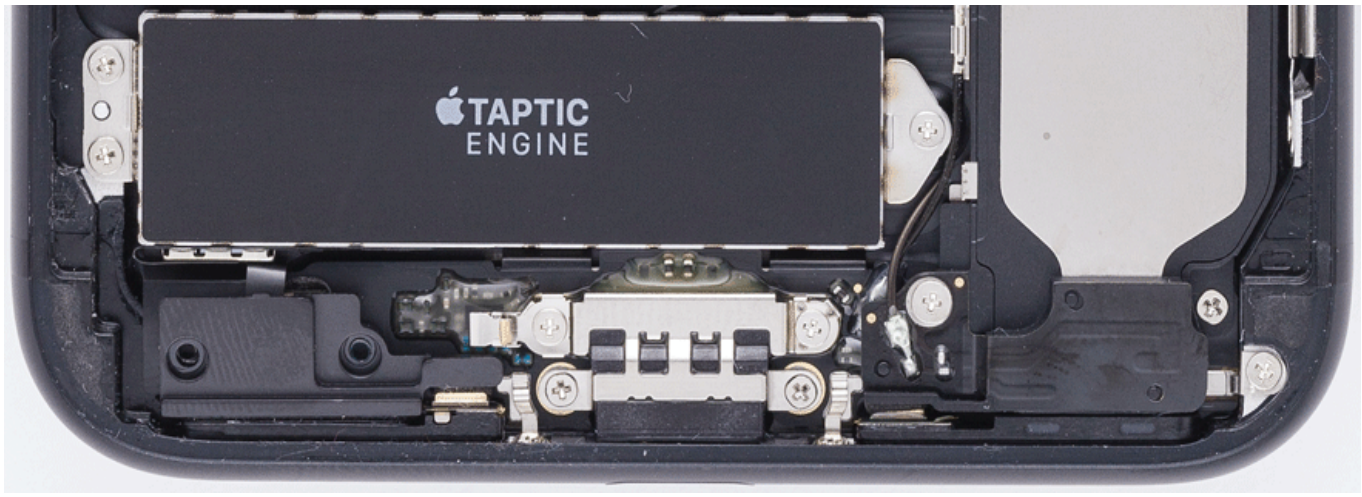
Known-good battery flex

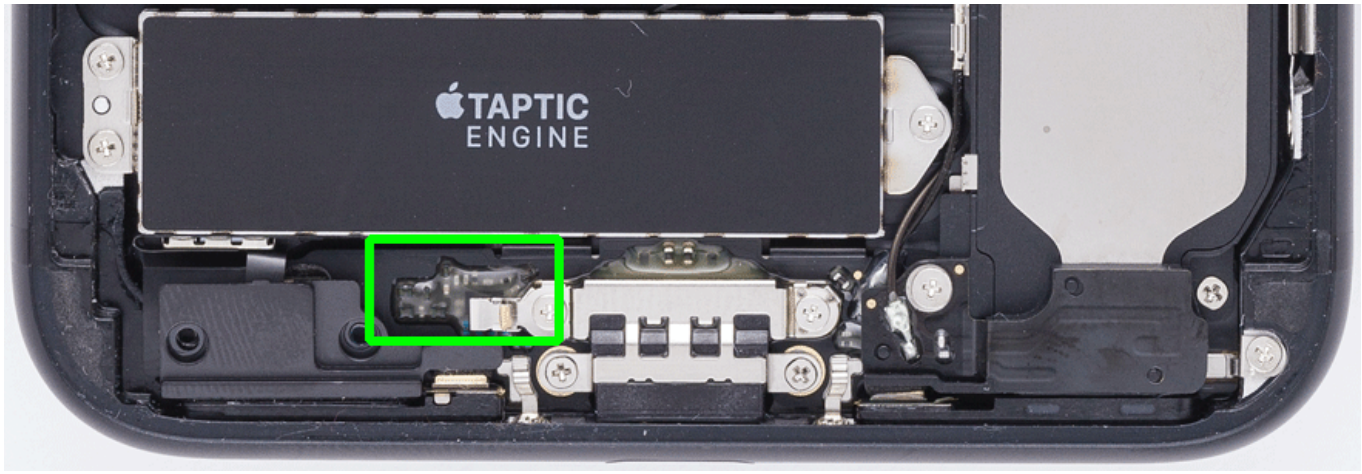


Damaged battery flex

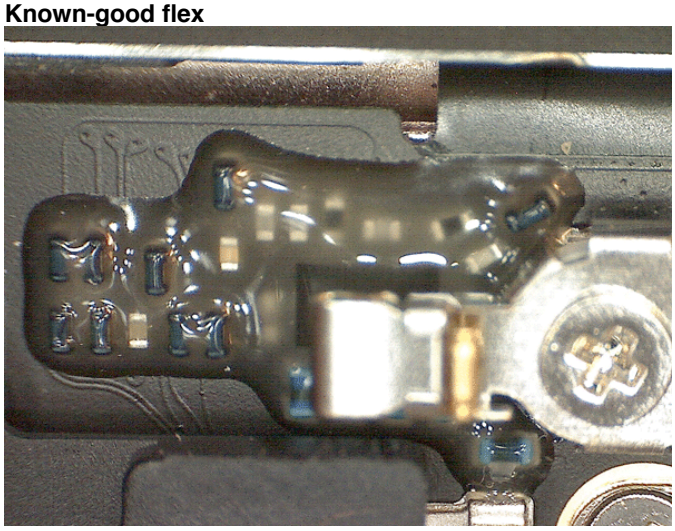


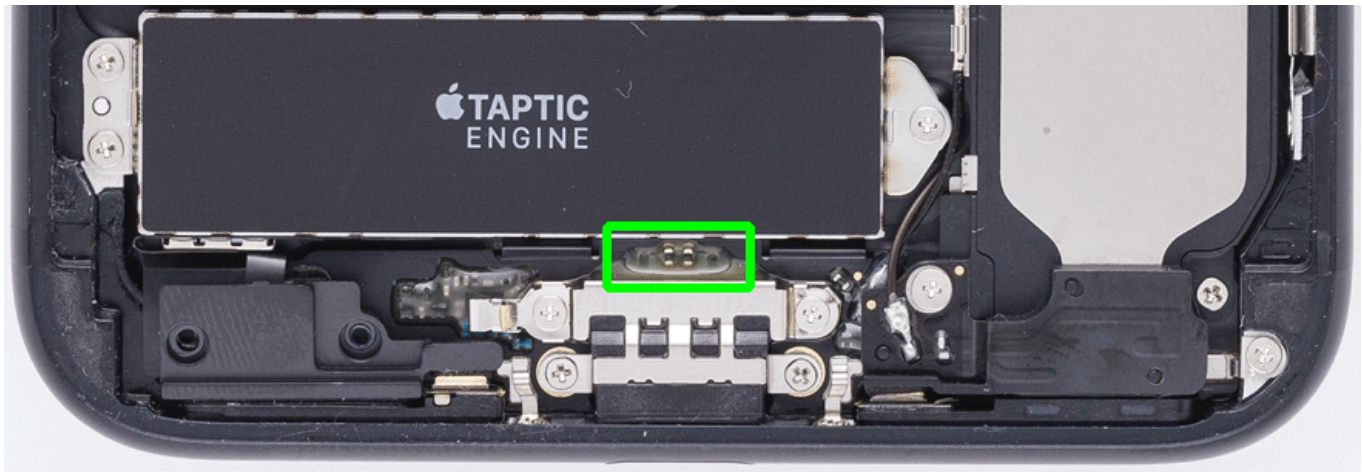
Dock Flex
Components in this area may vary in color.



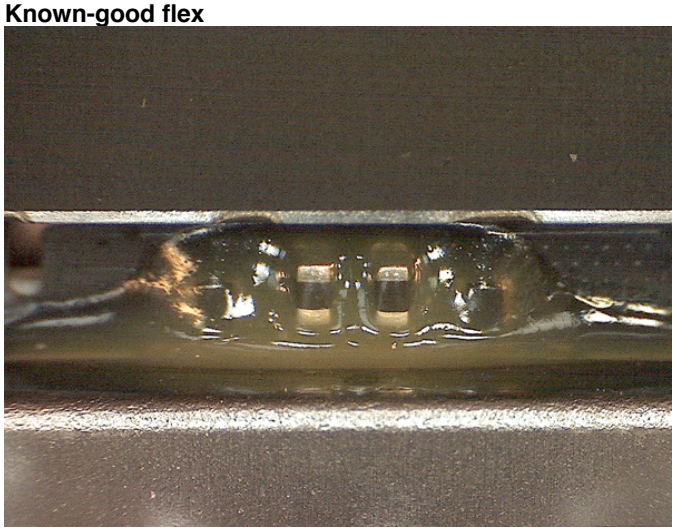


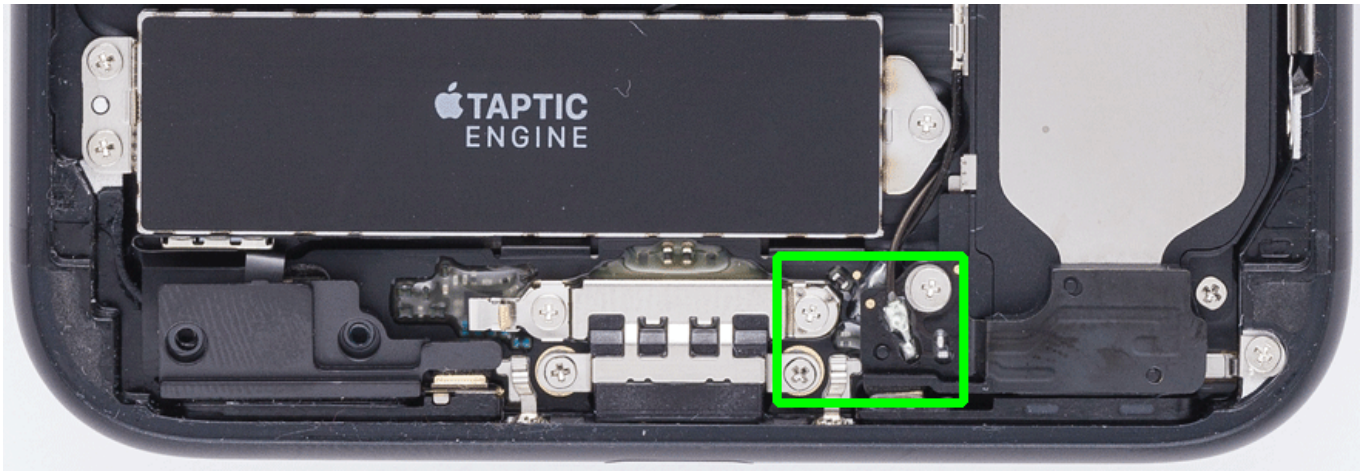
Known-good flex



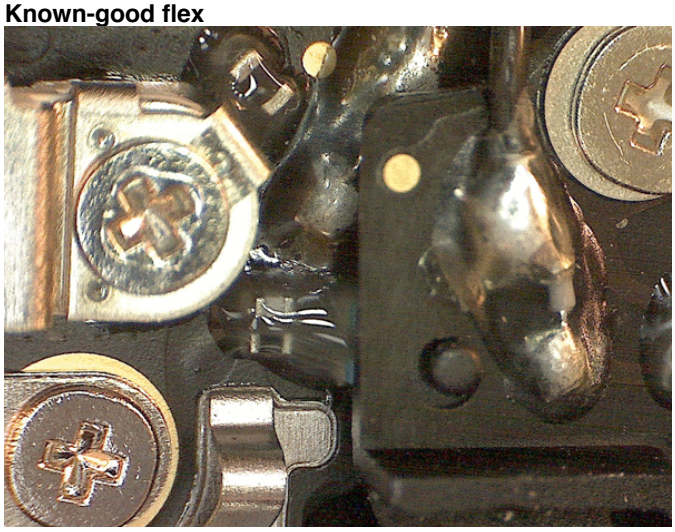


Known-good flex

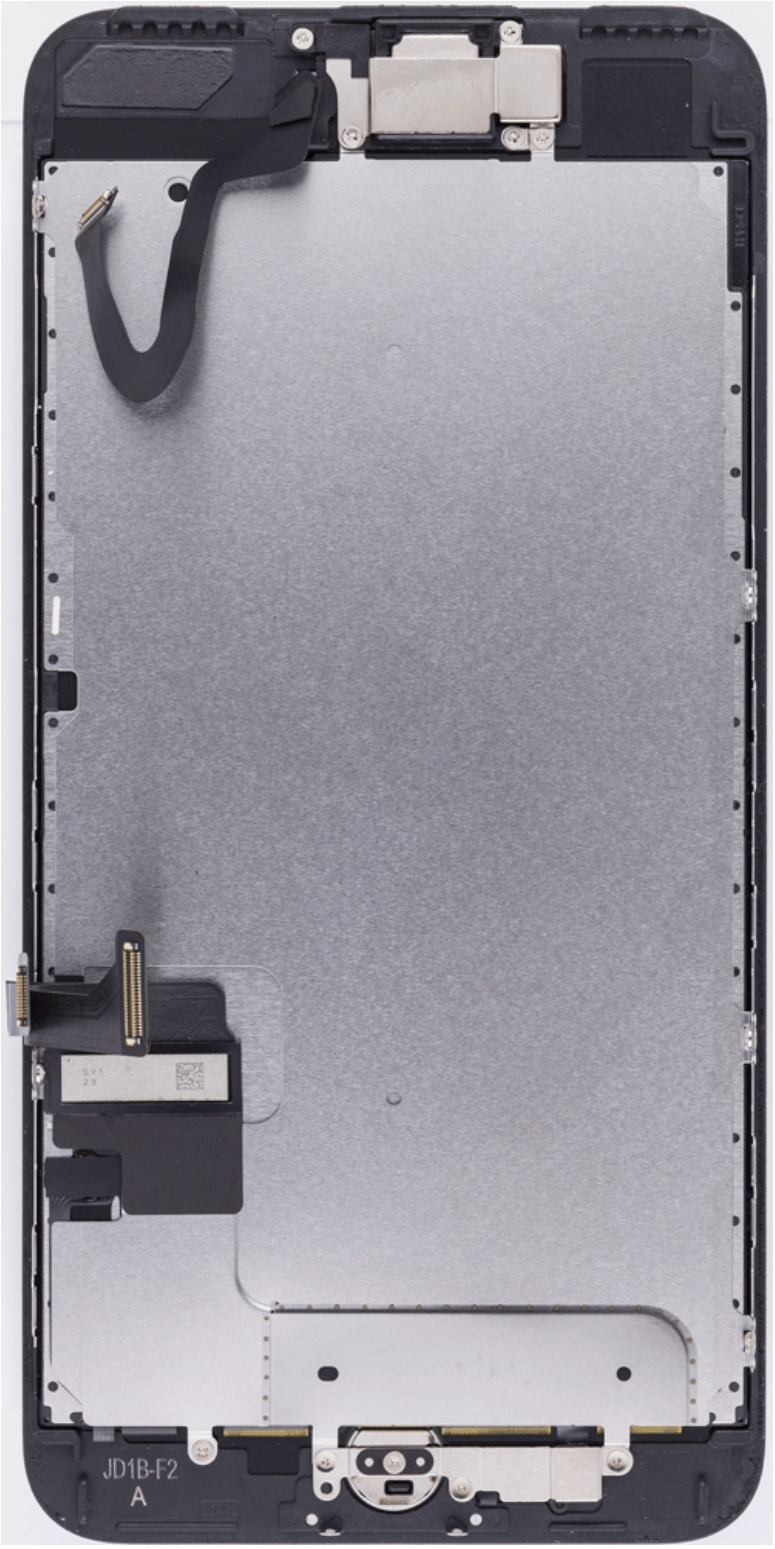




Known-good flex

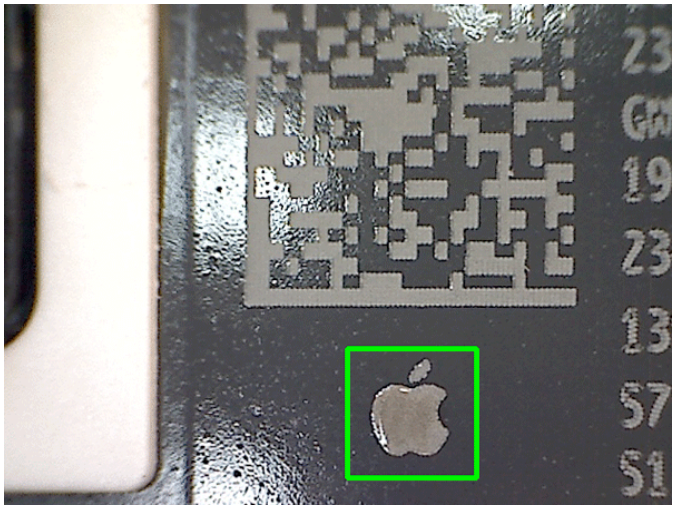


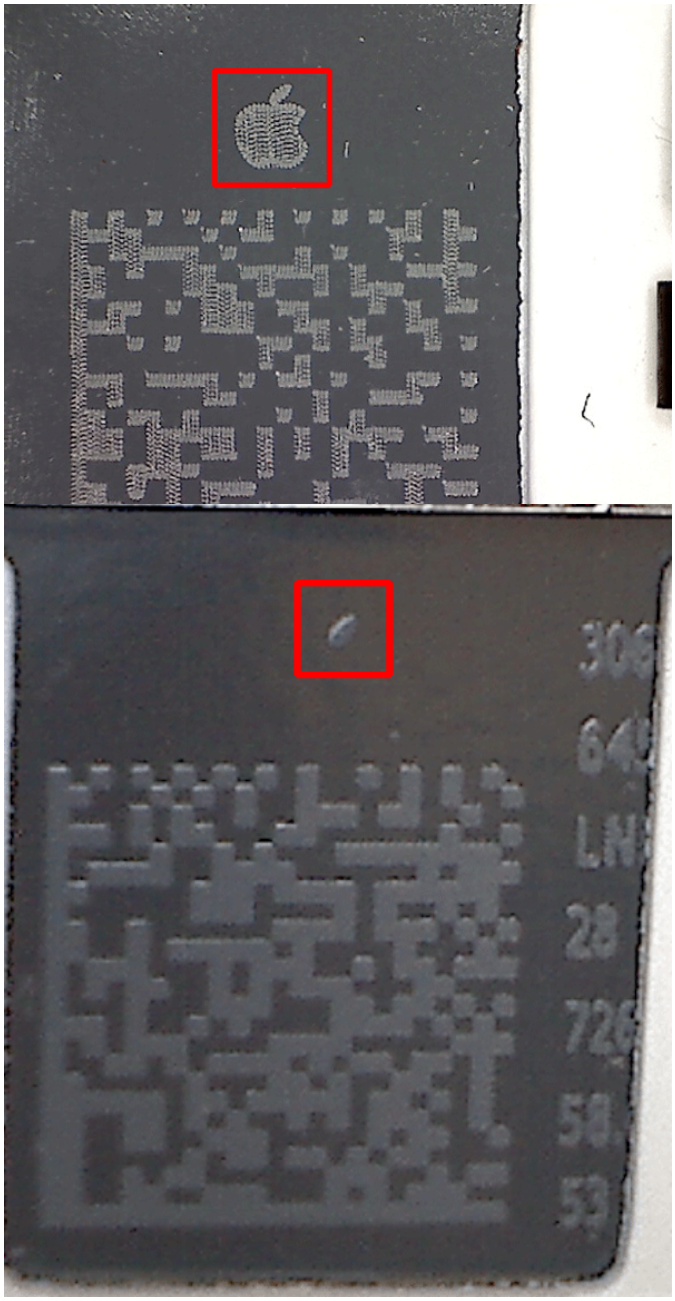
Display Assembly

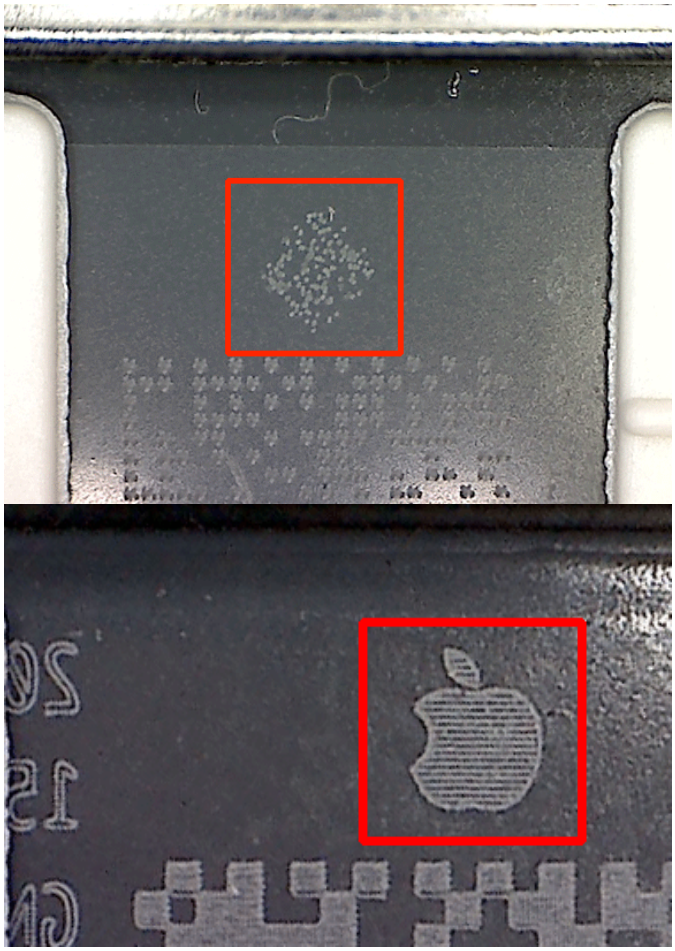


Inspect the top right of the display near the receiver for Apple logo and 2D bar code.

Known-good marking **Third-party marking**

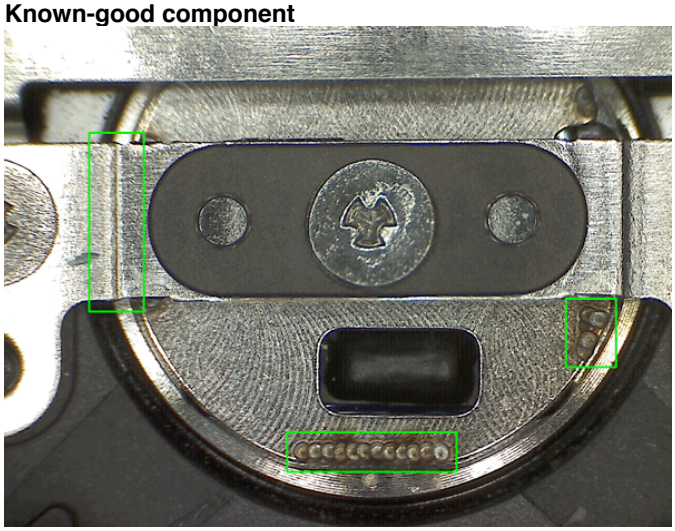

Z3
GW
19
Z3
13
57
S1


LN
28
53



Home Button Area

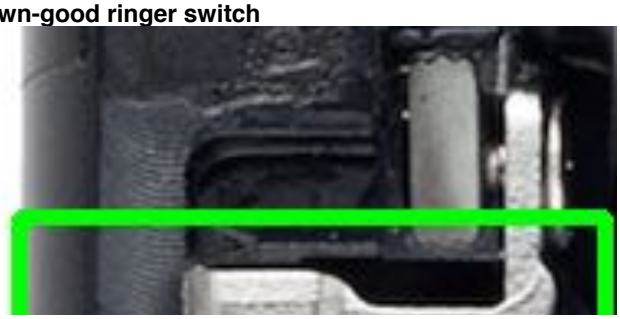
Known-good component

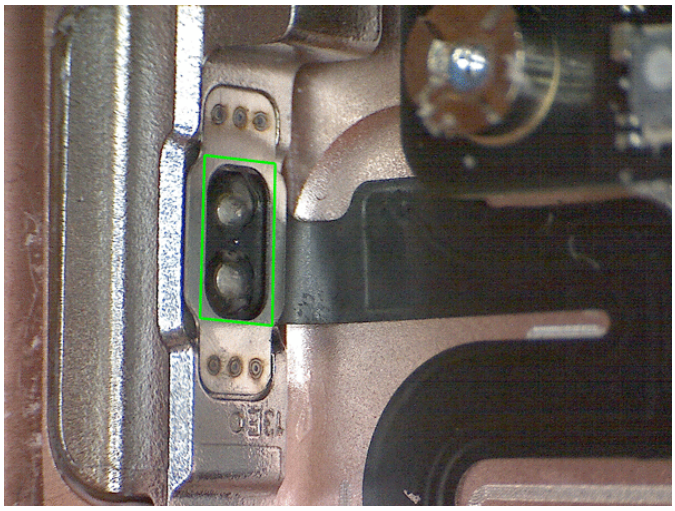


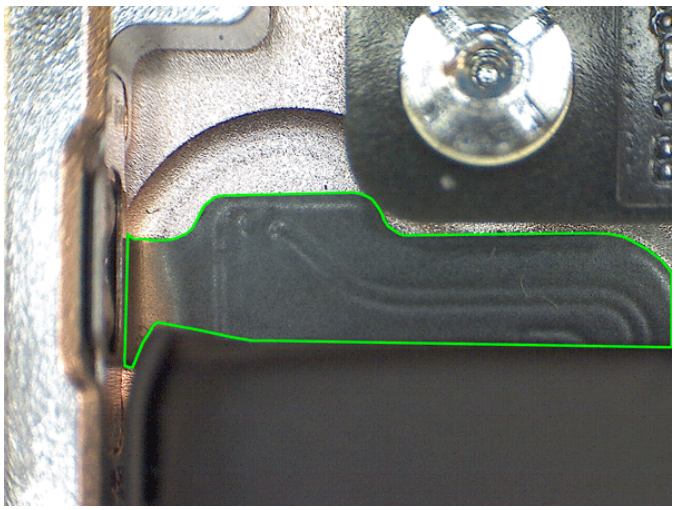
Buttons and Ringer Switch

Ringer switch, volume buttons, Sleep/Wake button

Known-good ringer switch

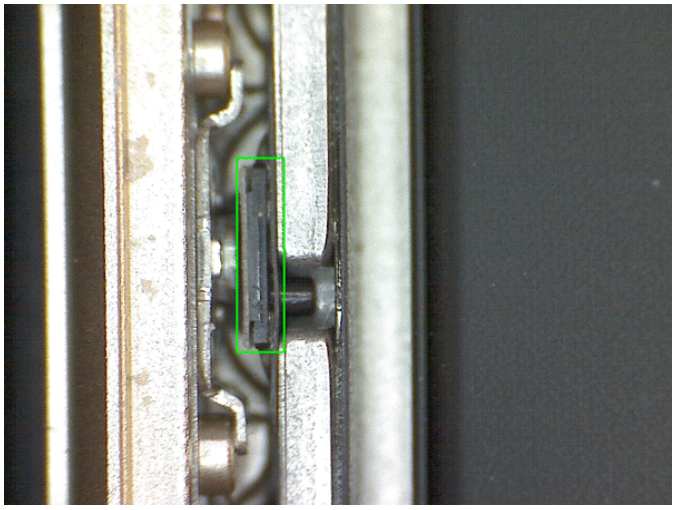


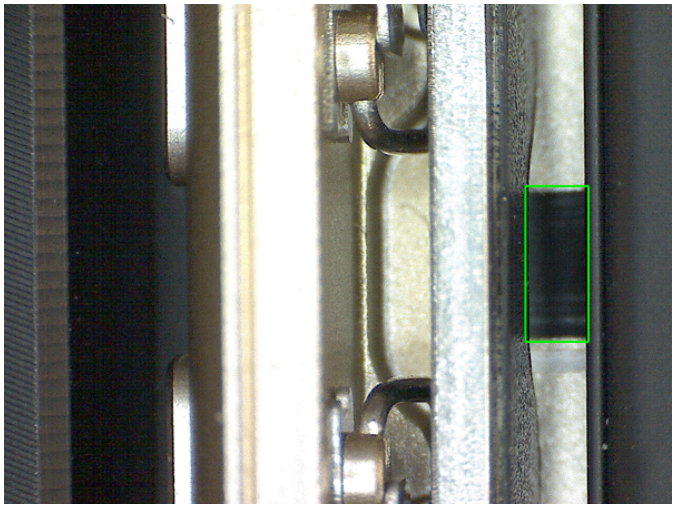




Check for damage, missing components, and foreign material.

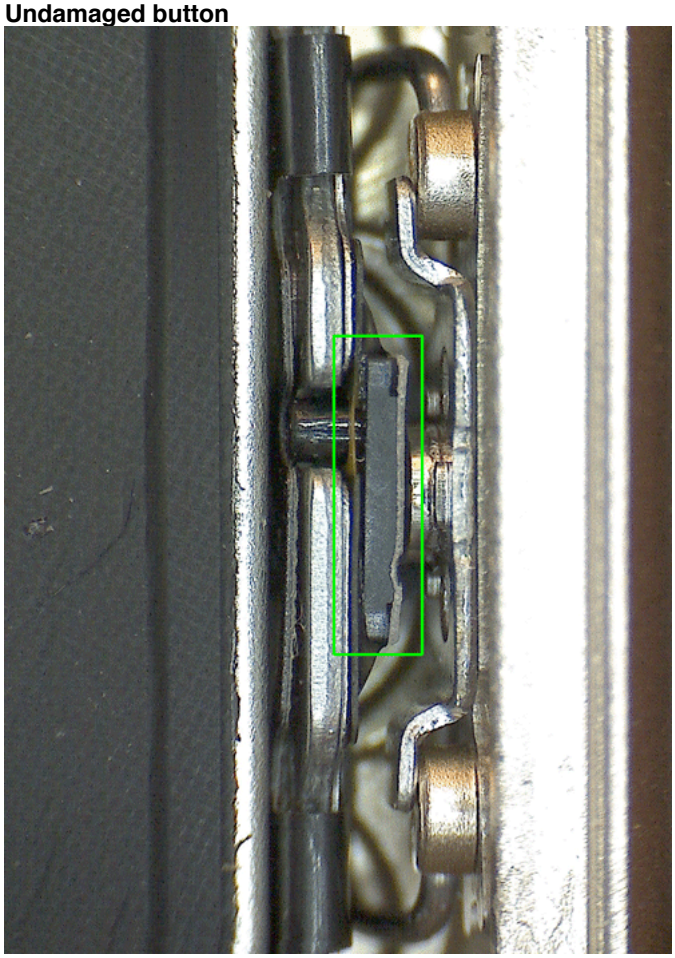
Known-good ringer switch



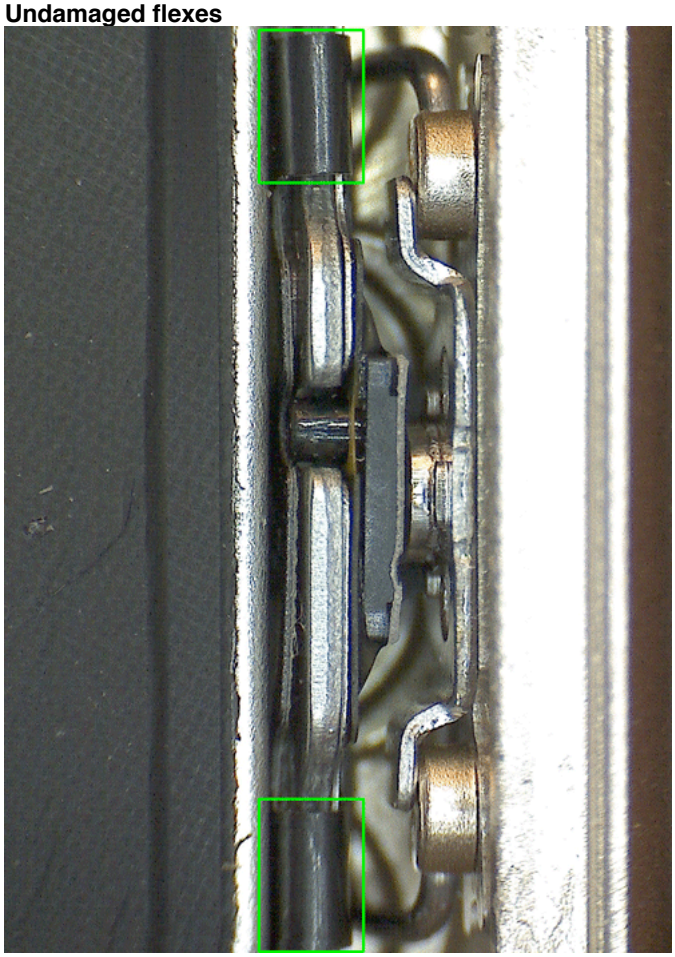


Check for damage, missing components, and foreign material.

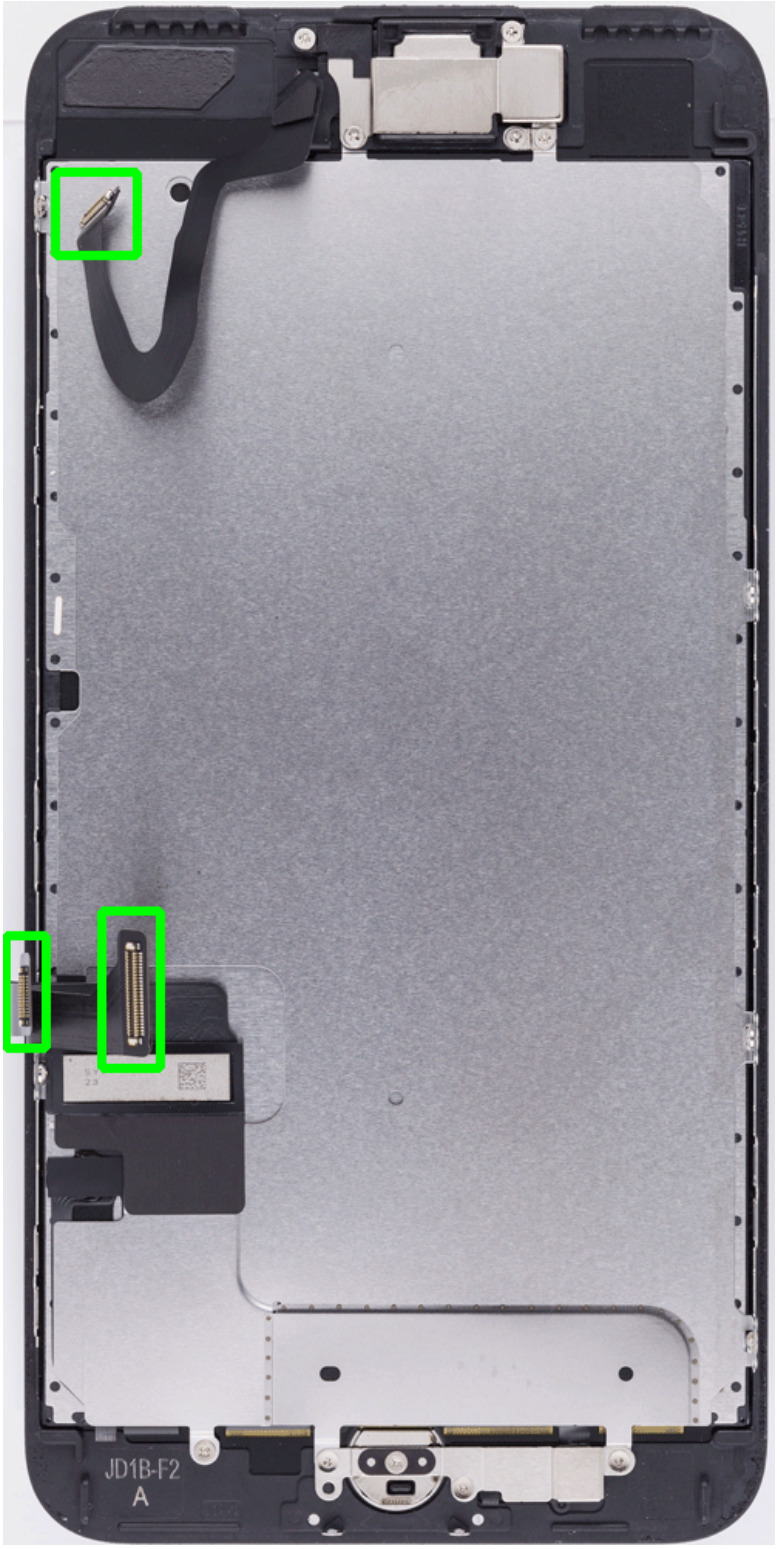
Undamaged button



Undamaged flexes

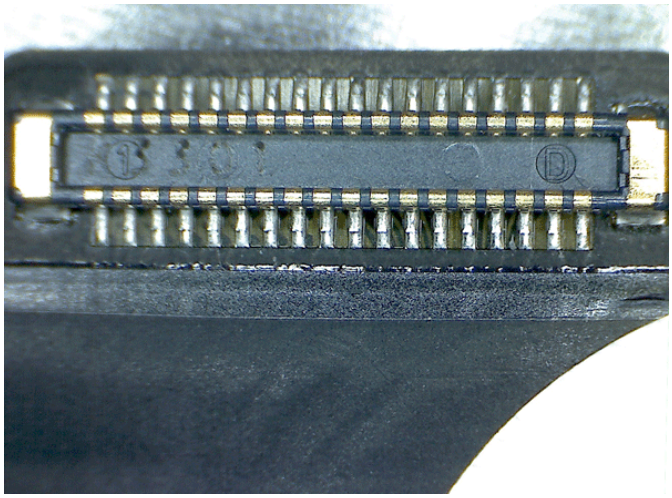


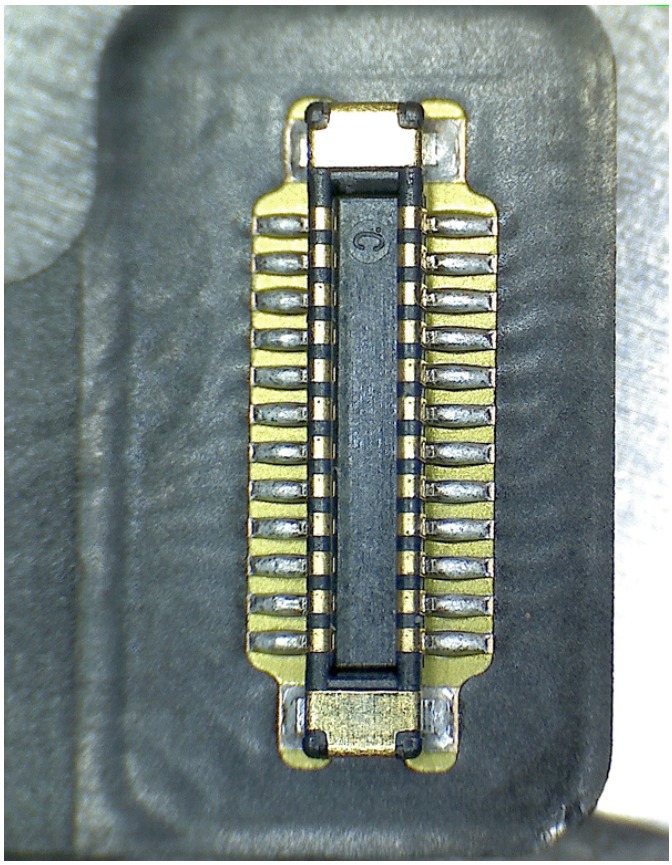
Display Flexes

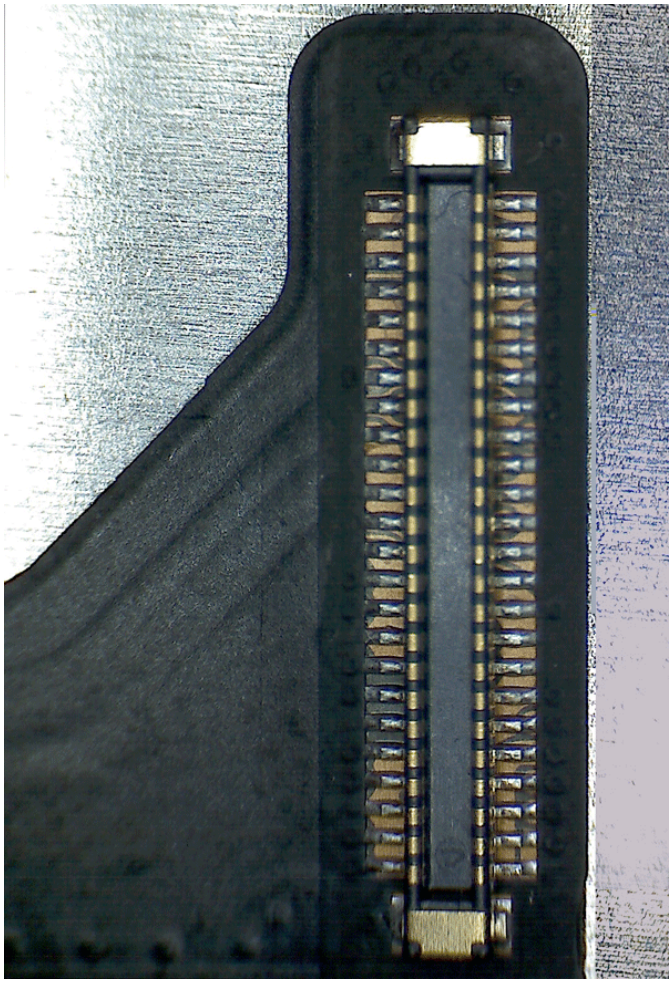


Damaged connectors may have missing pins, a cracked connector frame, or improperly soldered pins. Damaged connectors may also have solder between pins or pads. Partially cut or torn flexes are allowed, due to the possibility of damage during device opening. Complete cuts, tears, or punctures are positive signs of tampering.

Known-good flexes







Contactless Payment Reader

The Contactless Payment reader is used to verify the functionality of the Apple Watch and iPhone 6, 6 Plus, 6s, 6s Plus, SE, 7, and 7 Plus Apple Pay hardware only. The reader will not gather any payment data or information. The test will not charge the user's payment card and will not detect an issue with the user's account or bank systems.

Running the Apple Pay Test

1. Connect the Contactless Payment reader to an open USB port on a computer.
2. Hold the Apple Watch or top of the iPhone near the reader. If using an Apple Watch, then double-click the side button to activate Apple Pay.
3. If the user is present, then ask him or her to authorize Apple Pay. **Note:** This will not charge the user's payment card.

Results

- If the user authorizes the test, then the light on the reader will turn green and the reader will beep. This indicates that the hardware is functional.
- If the user does not authorize the test, then the light will stay red but the iPhone will continue to ask for authorization. This indicates that the hardware is functional.

If neither result occurs, then the hardware may not be functional. To continue troubleshooting, refer to articles:

- IT1150: Apple Watch: Apple Pay Issues
- IT1144: iPhone 6 and 6 Plus: Apple Pay Issues
- IT1210: iPhone 6s, 6s Plus, and SE: Apple Pay Issues
- IT1398: iPhone 7 and 7 Plus: Apple Pay Issues

Back Up User Data

Back Up User Data

Before troubleshooting a user's device, verify that the data is backed up to iCloud or to iTunes on the user's computer.

Note: If restoring user data from either backup method (iCloud or iTunes) causes an issue to return, there is no reason to restore from the other backup method as it will lead to the same result.

iCloud

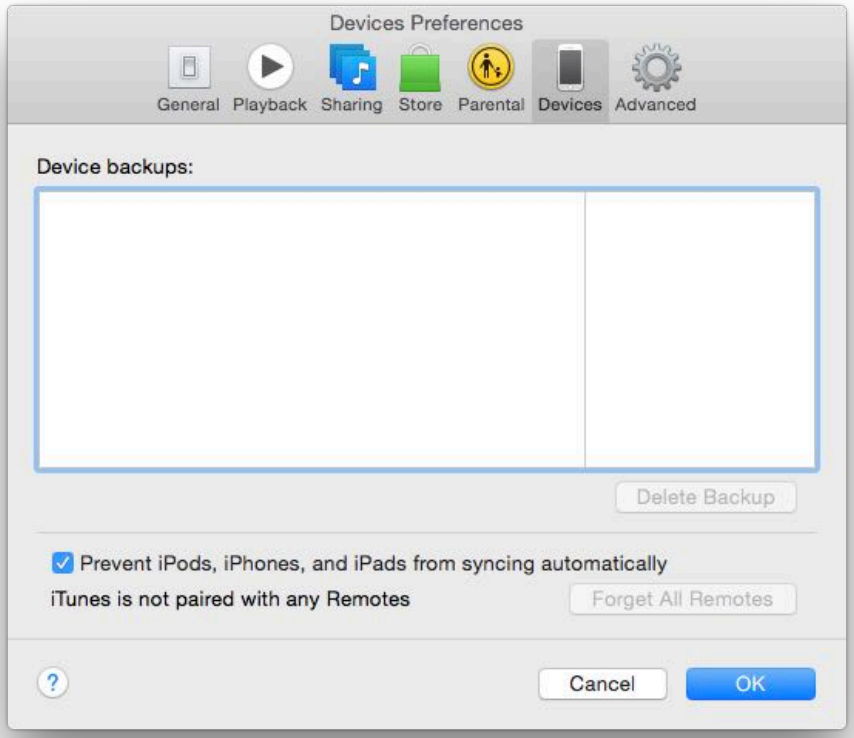
1. On the Home screen, tap Settings.
2. Tap iCloud.
3. Tap Storage.
4. Tap Manage Storage.
5. Verify the latest backup.

Learn more about iCloud at www.apple.com/icloud. Refer to article HT207428: What does iCloud back up?

iTunes on user's computer

1. Connect the user's device to the user's computer.
2. Open iTunes.
3. Select Preferences.
4. Select Devices.
5. Verify the latest backup in the "Device backups" pane.

Important: To avoid syncing a user's device to a test computer, go to iTunes > Preferences > Devices and select "Prevent iPods, iPhones, and iPads from syncing automatically."



Also refer to the following articles:

- HT203977: How to back up your iPhone, iPad, and iPod Touch
- HT204686: Erase your iPhone, iPad, iPod touch, or Apple Watch
- HT203271: If your iTunes backup couldn't be completed or you can't restore from a backup

Cleaning Procedures

Contents

This article includes the following sections:

Required Tools

- Lighted otoscope (or lighted magnifying glass)
- ESD-safe brush (922-9918)
- ESD-safe tweezers
- Microfiber cloth
- Compressed air (for AirPod lightning connector only)
- Foam swab
- Isopropyl alcohol (IPA) wipe

Caution: Never use compressed air to clean any part of an iPhone, iPad, or iPod, as this can damage delicate components.

Dock or Lightning Connector - iPhone, iPad, iPod

Debris in the dock or Lightning connector can cause performance issues, such as:

- Unable to charge battery.
- Device not recognized by iTunes/computer/accessory.

Cleaning Procedure:

1. Power off the device.
2. Use a lighted otoscope or magnifying glass to inspect for debris.
3. Use an ESD-safe brush to delicately brush out lint or debris. Be careful not to damage any metal contacts.
   Note: Avoid brushing debris into the speaker or microphone, if present, on either side of the dock or Lightning connector.
4. If needed, use ESD-safe tweezers to carefully pull out any large pieces of lint or debris. Be careful not to damage any metal contacts.

Headphone/Headset Jack

Debris in the headphone/headset jack can cause audio or functional issues, such as:

- Device is stuck in headphone mode and no audio is heard from receiver (if present) or speaker.
- Headphone audio is distorted (static or crackles) or is not functioning.
- Headphone audio is only heard in one channel.
- Headphone microphone has distorted sound or no sound.
- Headphone connector will not fit all the way into headphone/headset jack.

Warning: Do not use long metal tools (such as screwdrivers or dental picks) while cleaning inside the headphone/headset jack, as this could lead to battery puncture.

1. Use a lighted otoscope or magnifying glass to inspect for debris.
2. Use an ESD-safe brush to brush out lint or debris. Use just enough bristles to fit inside the headphone/headset jack. Twist the bristles to loosen and lift out debris.

Speaker and Microphone

Debris blocking the speaker and microphone openings can cause audio performance issues, such as:

- Low or distorted volume audio from the speaker.
- Muffled, low volume, or distorted audio recorded from the microphone.

Cleaning Procedure:

1. Use an ESD-safe brush to gently brush cover openings of the speaker and/or microphone, if present.
   Note: Avoid brushing debris into the dock or Lightning connector by brushing debris away from the connector.

Receiver - iPhone only

Debris blocking the receiver opening can cause audio performance issues, such as:

- Muffled, low volume, or distorted audio through the receiver.

Cleaning Procedure:

1. Inspect the receiver for loose debris.
2. Use an ESD-safe brush to **gently** brush the cover mesh in the receiver opening to remove debris.
   Caution:
   - Use extreme care to avoid damaging the microphone embedded within the receiver opening.
   - Avoid using large sweeping motions across the glass, as this could lead to scratches.
3. Use a microfiber cloth to clean away the loosened debris.

SIM Tray

Dirt and debris around SIM tray slot of the device can appear dirty and cause issues, such as:

- Difficulty opening/closing SIM tray.
- Dirt and debris entering device when SIM tray is ejected and removed.

1. Eject SIM tray from device.

2. Use alcohol wipe to gently wipe around edges of SIM tray to remove dirt from edges.
3. Use alcohol wipe to gently wipe around edges of SIM tray slot on device to remove dirt from edge.
4. Inspect to verify dirt has been removed.
5. If any dirt still remains, use alcohol wipe and repeat steps 2 and 3.

Loop Holder - iPod touch (5th generation) only

Debris blocking the loop holder can cause functional issues, such as:

- Loop holder does not respond to touch.
- Loop holder does not open/close.

1. Use an ESD-safe brush to delicately brush out lint or debris. If needed, use ESD-safe tweezers to pull out any large pieces of lint or debris.

Lightning Connector - AirPod Charging Case

Debris in the Lightning connector can cause this performance issue:

- Unable to charge the case battery.

Cleaning Procedure:

1. Use a lighted otoscope or magnifying glass to inspect for debris.
2. Blow away any loose debris with compressed air.

3. If debris still remains, use an ESD-safe brush to delicately brush out debris.

4. If needed, use ESD-safe tweezers to carefully pull out any large pieces of debris.
   Caution: Be careful not to damage any metal contacts.
5. Use compressed air to remove any remaining loose debris.
6. Clean the outside of the case with a microfiber cloth.

Internal AirPod Charging Case

Contaminated contacts or debris in the AirPod wells can cause this performance issue:

- Unable to charge the AirPods

Caution: Do not use compressed air to clean inside the AirPod wells as this can cause debris to get stuck behind the contacts.

1. Use a lighted otoscope or magnifying glass to inspect the AirPod wells for debris and the contacts for contamination.

2. Open an IPA wipe packet and insert the foam end of the swab.

3. Press the foam end of the swab inside the IPA wipe packet to transfer enough alcohol to moisten it.

4. Use the moist foam swab to very gently rub the contacts in a vertical up-and-down motion.
Caution: To protect the spring finger contacts, do not twirl the swab or excessively force it on the contacts.

5. Gently clean out any other debris in the wells or inside the charging case.

Common Troubleshooting Procedures

When troubleshooting, attempt the common troubleshooting procedures in the order listed in the table below. Click the name of a quick fix procedure for detailed information.

Important:

- These steps may not be effective for all issues. Apply only the steps necessary to isolate and resolve the user's issue.
- Before servicing a device, ensure that the customer has disabled Find My iPhone in Settings. For more information, refer to article HT201365: Find My iPhone Activation Lock.

Procedure	Action
Update to Latest Software	Go to Settings > General > Software Update, if available; or Use the latest version of iTunes (www.apple.com/itunes/download) to check for the latest iOS. Connect the device to the computer, go to iTunes > (Device) > Summary, and click the “Check for Update” button.
Charge Battery	Connect to a known-good power outlet, using a known-good Apple USB Power Adapter and Lightning to USB Cable to charge the battery. Do not charge via a computer port. **Note:** The device may have entered a deep discharge state that requires 20–30 minutes of charging to turn on. The battery trap should be visible within two minutes on the screen while charging.
Force an App to Close	1. Double-click the Home button to see preview screens of recently used apps. 2. Swipe the app’s preview screen up and out of the preview.
Restart	A restart forces the device to close all open files and turns off all hardware components. 1. Press and hold the Sleep/Wake button until a red slider appears. 2. Slide your finger across the slider to turn off the device. 3. To turn the device on, press and hold the Sleep/Wake button until the Apple logo appears.
Reset	**Perform a reset only if unable to do a restart.** Press and hold the following two buttons together for at least 10 seconds, until the Apple logo appears. • iPhone 6s or earlier, iPad, and iPod touch: Sleep/Wake button and Home button. • iPhone 7: Sleep/Wake button and Volume down button.
Erase All Content and Settings*	Erases all user content and settings, including installed apps. From the Home screen, choose Settings > General > Reset > Erase All Content and Settings. If possible, try this before a restore because it is much faster.
Restore*	Erases all software and data and installs a fresh copy of iOS. Connect the device to the computer, go to iTunes > (Device) > Summary, and click the “Restore” button.
Recovery Mode Restore*	Recovery mode loads only the firmware drivers necessary for iTunes to recognize the device. Click the link at left for instructions.
DF Reset	A Device Firmware Reset may resolve an issue that caused the device to not turn on and all other attempts have failed. Click the link at left for instructions.
DFU Restore*	Device Firmware Update (DFU) allows you to perform a restore when all other attempts to restore the device have failed. Click the link at left for instructions.

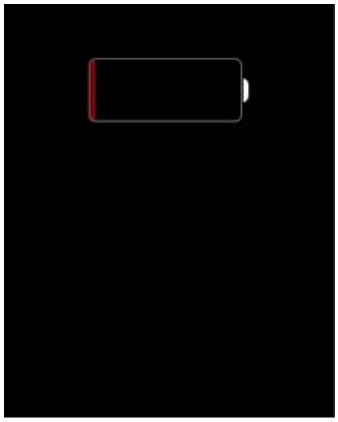
*Caution: This will delete all user data and settings on the device. If saving content is important to the user, a backup should be made before beginning this process.** If restoring user data from either an iCloud or iTunes backup causes an issue to return, there is no reason to restore from the other backup method as it will lead to the same result.

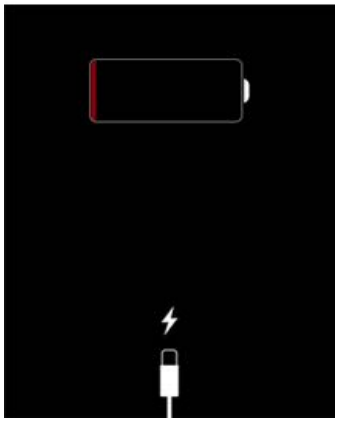
Charge Battery

The device must have sufficient battery charge to proceed with troubleshooting. A low battery condition can cause many issues.

If the device has any of the following symptoms, it should be connected to an Apple USB Power Adapter to charge for at least 10 minutes:

- Will not turn on
- Black screen
- Shows the “battery trap” image
- Low battery charge





Note: If the device is extremely low on power, the display may be blank for up to two (2) minutes before one of the low-battery images appears. An Apple USB Power Adapter delivers more power than the USB ports of some computers, so the power adapter is the recommended initial charging method for a low battery. Once the device has started up to the iOS, it can be disconnected from the power adapter and connected to a computer.

If troubleshooting or testing will be performed without the device connected to power, check that the device has a sufficient charge before continuing.

Important:

- Before connecting any cable to the dock connector, Lightning connector, or headset jack, check the port connections for debris, contamination, corrosion, liquid, or damage. Clean or remedy these issues before connecting any cables.
- If the device becomes too hot while charging, disconnect and replace the device.
- Only use a known-good Apple USB Power Adapter when charging from a power outlet. While other power adapters may appear to be compatible, their lower power output is not sufficient to charge the device.
- The battery icon in the upper right corner of the screen shows the battery charging status and approximately how much charge is left in the battery. When the device is connected to a power source, a small lightning bolt icon will appear next to the battery icon.

  Note: An iPad may take longer to charge while syncing or using the iPad. If the iPad is connected to a source that does not provide enough power to sufficiently charge the device, the notification “Not Charging” appears next to the battery indicator in the status bar (top right corner).

Refer to the following articles for more information:

- HT201569: If your iPhone, iPad, or iPod touch won't charge
- HT201264: About the battery usage on your iPhone, iPad, and iPod touch
- www.apple.com/batteries

Force an App to Close

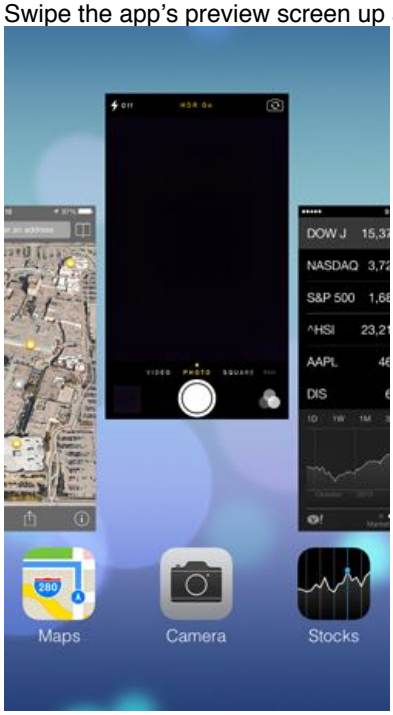
This procedure forces an app to close that is not responding to input or does not perform as expected. This is a recommended first troubleshooting step.

Procedure for iOS 9 and 10:

1. Double-click the Home button to see preview screens of recently used apps.
2. Swipe the app's preview screen up and out of the preview.

Procedure for iOS 7 and iOS 8:

1. Double-click the Home button to see preview screens of recently used apps.
2. Swipe the app's preview screen up and out of the preview.



Refer to the following articles for more information:

- HT201330: Force an app to close on your iPhone, iPad, or iPod touch
- HT202070: Switch apps on your iPhone, iPad, or iPod touch
- HT201398: If an app you installed unexpectedly quits, stops responding, or won't open

Restart

A restart properly saves user data, closes down all open applications and powers off all hardware components, then restarts the device.

A restart can quickly resolve a wide range of issues, including:

- App(s) unexpectedly quit.
- Battery life is shorter than expected.
- Hardware not performing as expected.
- Interface or apps are slow to respond.
- iTunes does not recognize or sync with the device.

Procedure:

1. Turn off the device: Press and hold the Sleep/Wake button for a few seconds until the red slider appears, and then drag the slider.
2. Turn on the device: Press and hold the Sleep/Wake button until the Apple logo appears.

Note: If you cannot restart the device because it is unresponsive, a Reset is the next appropriate troubleshooting step.

Reset

If the device is unresponsive and restart does not work, try to reset it.

IMPORTANT: Perform a reset ONLY if unable to do a restart.

Key Points:

- Reset only when you cannot restart the device normally.
- A reset removes all power for a fraction of a second to power off the device.
- A reset does not close open files or save data before the device powers off.
- **CAUTION: A reset can potentially cause file or operating system damage, requiring a restore.**

Procedure:

1. Press and hold the following two buttons together for at least 10 seconds, until the Apple logo appears.
    - iPhone 6s or earlier, iPad, and iPod touch: Sleep/Wake button and Home button
    - iPhone 7: Sleep/Wake button and Volume down button

Erase All Content and Settings

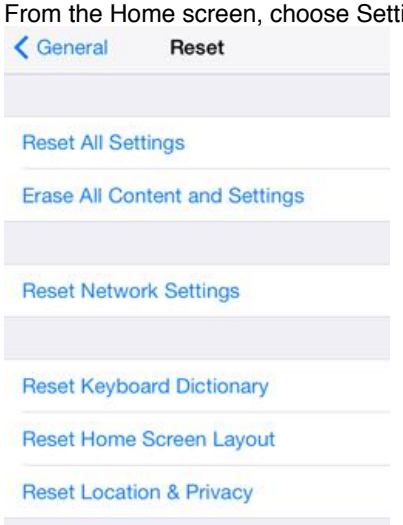
Erase All Content and Settings is a quick way to get a device back to factory settings. It will delete all user content and settings, but does not reinstall iOS like a restore does. Erase All Content and Settings can resolve software issues more quickly than a time-consuming restore.

Caution: This will delete all user data and settings on the device.

Important: Before servicing a device, ensure that the customer has disabled Find My iPhone in Settings. For more information, refer to article HT201365: Find My iPhone Activation Lock.

Procedure:

1. From the Home screen, choose Settings > General > Reset > Erase All Content and Settings.



Also see article HT201274: Erase your iPhone, iPad, iPod touch, or Apple Watch.

If Erase All Content and Settings does not resolve an issue, proceed with a Restore.

Restore

A restore completely erases the device and reinstalls a fresh copy of iOS.

Caution: This will delete all user data and settings on the device.

IMPORTANT: Before servicing a device, ensure that the customer has disabled Find My iPhone in Settings. For more information, refer to article HT201365: Find My iPhone Activation Lock.

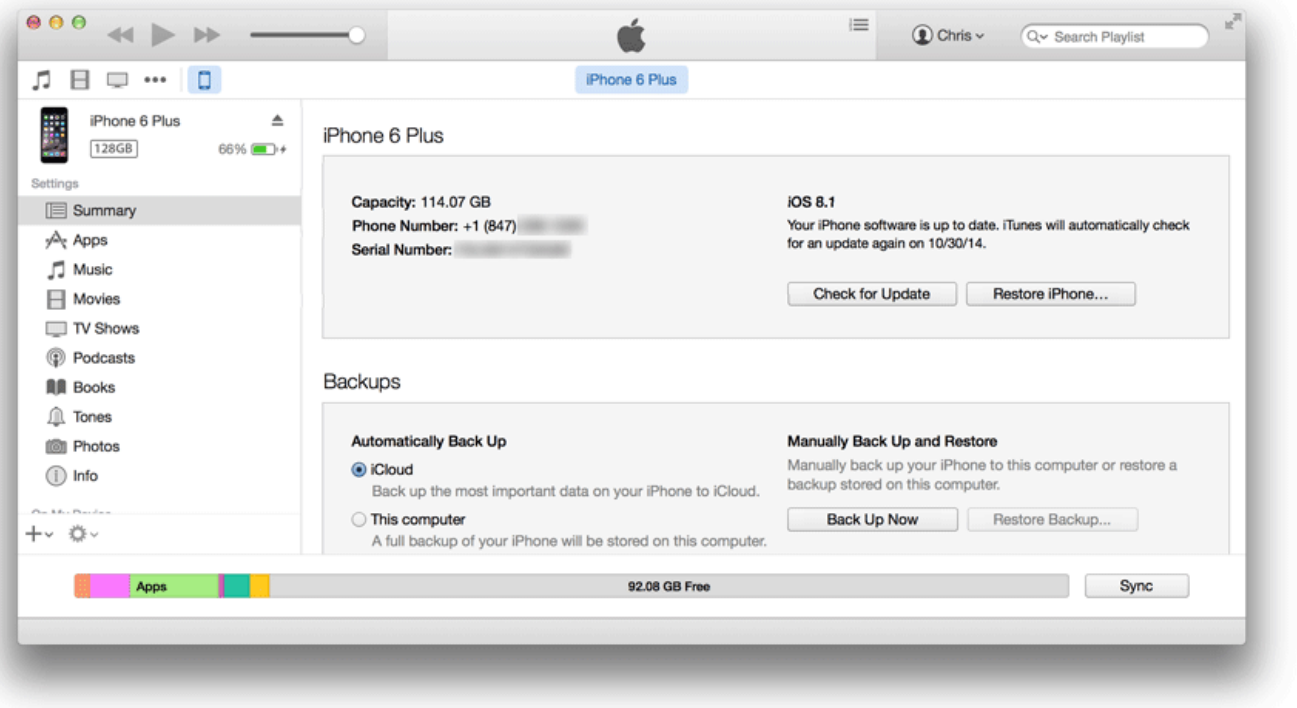
Key Points:

- A restore erases all user content, settings, and iOS files, and then reinstalls only iOS.
- A restore is time-consuming, especially if you have to download the restore package.
- If iTunes displays an alert with an error code, refer to articles:
  - HT204770: Get help with iOS update and restore errors
  - HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod
- When the restore is complete, test the device before restoring a backup or syncing content. Refer to articles:
  - HT204136: About backups for iOS devices
  - HT203977: How to back up your iPhone, iPad, and iPod touch

Note: Do not set up as a new device, as this can erase previous backups. Copy or rename the backup folder before proceeding. Refer to article HT201252: Restore your iPhone, iPad, or iPod to factory settings.

Procedure:

1. Connect the device to a computer running the latest version of iTunes.
2. In the left column under Devices, click on the device name, then go to the Summary panel and click the Restore button.



Recovery Mode Restore

If iTunes cannot detect the device or a specific restore error appears, check the cable connections. If the issue persists, consider forcing the device into recovery mode.

Caution: This will delete all user data and settings on the device.

If you cannot restore a device, even when using recovery mode, service or replacement may be the appropriate option.

Note: If the device is connected to iTunes, updating the software may resolve an issue without erasing settings and content. If updating the software does not work, it may be necessary to restore the device, which will erase all settings and content.

Important: Before servicing a device, ensure that the customer has disabled Find My iPhone in Settings. For more information, refer to article HT201365: Find My iPhone Activation Lock.

Key Points

- Recovery mode loads only the firmware drivers necessary for iTunes to recognize the device.
- To force the device into recovery mode, turn off the device, then connect it to a USB port on the computer while holding the Home button (iPhone 6s or earlier, iPad, and iPod touch) or Volume down button (iPhone 7).
- If the device does not turn off, then try a reset to turn it off.
- If iTunes displays an alert with an error code, then refer to the following articles:
  - HT204770: Get help with iOS update and restore errors
  - HT201210: If you see an error when you update or restore your iPhone, iPad, or iPod

Note: In certain situations, a device will automatically go into recovery mode after an update or restore issue. If the device is already in recovery mode, then attempt to restore the device using iTunes.

Procedure:
Use the following steps to place a device into recovery mode. If the device is already in recovery mode, start at step 6.

1. Disconnect the USB cable from the device, but leave the other end of the cable connected to the computer's USB port.
2. Turn off the device: Press and hold the Sleep/Wake button for a few seconds until the red slider appears, then slide the slider. Wait for the device to turn off.

   Note: If you cannot turn off the device using the slider, then perform a reset:

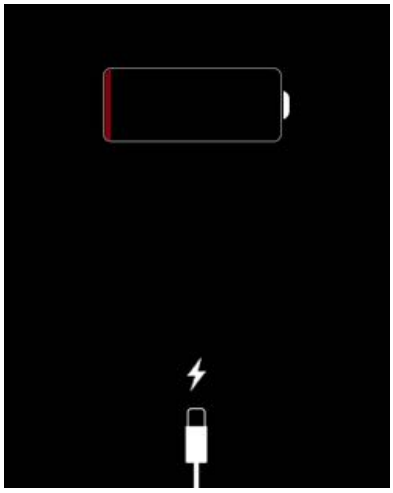
   a. Press and hold the following two buttons together.

   - iPhone 6s or earlier, iPad, and iPod touch: Sleep/Wake button and Home button
   - iPhone 7: Sleep/Wake button and Volume down button

   b. When the device turns off, release the Sleep/Wake button and continue holding the Home button (iPhone 6s or earlier, iPad, and iPod touch) or Volume down button (iPhone 7).

3. While pressing and holding the Home button (iPhone 6s or earlier, iPad, and iPod touch) or Volume down button (iPhone 7), reconnect the USB cable to the device. When you reconnect the USB cable, the device should turn on.

   Note: If you see the "battery trap" image (below), let the device charge for at least 10 minutes to ensure that the battery has some charge, then repeat step 2.



4. Continue holding the button until you see the “Connect to iTunes” screen (below). When this screen appears, you can release the button.

5. If necessary, open iTunes. You should see an alert that iTunes has detected a device in recovery mode.
6. Use iTunes to restore the device.

If you do not see the “Connect to iTunes” screen, try these steps again. If you see the “Connect to iTunes” screen but the device does not appear in iTunes, refer to article [HT204095: If iTunes doesn't recognize your iPhone, iPad, or iPod]() .

If you decide not to do a restore, you may be able to exit recovery mode by resetting the device.

DF Reset and DFU Restore

Device Firmware Reset

When all other attempts have failed to turn on a device, a DF reset may resolve the issue.

Timing is critical — use a watch to time the steps below:

1. Connect the device to an AC power adapter. Do not connect the device to a computer.
2. Press and hold the following two buttons together for **15 seconds**, then release the Sleep/Wake button.
    - iPhone 6s or earlier, iPad, and iPod touch: Sleep/Wake button and Home button
    - iPhone 7: Sleep/Wake button and Volume down button
3. Continue to hold the following button for **20 seconds**:
    - iPhone 6s or earlier, iPad, and iPod touch: Home button
    - iPhone 7: Volume down button
4. Leave the device connected to the charger for five minutes.
5. After five minutes, press and hold the two buttons listed above (depending on device model) for 20 seconds or until you see the Apple logo.

If Apple logo does not appear on the device, then connect the device to iTunes. If the device is seen in iTunes but the device display is blank, then restore the device.

Device Firmware Update Restore

When all other attempts have failed to restore a device, a DFU restore may allow you to perform a restore.

A DFU restore is only necessary if:

- The device will not turn on even after a DF reset (the steps above).
- The device will not go into recovery mode.
- The device will not charge.

Caution: This will delete all user data and settings on the device.

IMPORTANT: Before servicing a device, ensure that the customer has disabled Find My iPhone in Settings. For more information, refer to article HT201365: Find My iPhone Activation Lock.

Procedure:

Timing is critical — use a watch to time the steps below:

1. Charge the device for at least **five minutes**, then connect it to iTunes. If the device is not detected, open iTunes and move to step 2.
2. Press and hold the following two buttons together for **eight seconds**, then release the Sleep/Wake button.
    - iPhone 6s or earlier, iPad, and iPod touch: Sleep/Wake button and Home button
    - iPhone 7: Sleep/Wake button and Volume down button
3. Continue to hold the two buttons listed above (depending on device model) until you see the “Recovery Mode” message in iTunes, which may take up to **30 seconds**.

Note: In DFU mode, the device’s screen is blank.

If you did not get the “recovery mode” message in iTunes or the device’s screen is not blank or black, repeat **all** steps, paying careful attention to your timing.

If you decide not to do a restore, you may be able to exit DFU mode by resetting the device.

Take-Apart General Information

Before You Begin

- **Important: Refer to the Visual/Mechanical Inspection (VMI) guidelines to determine whether the device has any accidental damage.** Check for Liquid Contact Indicator (LCI) activation before opening the device. One externally visible LCI can be viewed by removing the SIM tray. Refer to article TP1137: Internal Checks for LCI locations.
- Remove any cases or screen protectors, as they may inhibit proper testing.
- Verify the user-reported symptom(s) and identify the correct part(s) needed for repair.
- Ensure that the device is turned off (by using the red slider).

Electrostatic Discharge (ESD) Precautions

Proper ESD precautions must always be used when opening an iPhone. Make sure you are working on a properly grounded ESD-safe mat and are wearing a properly connected ESD-safe wrist strap.

For more information about ESD, refer to:

- OP100: Electrostatic Discharge Precautions and Myths
- ATLAS: ESD Precautions

Required Tools

The following tools are required to service iPhone 6 and later:

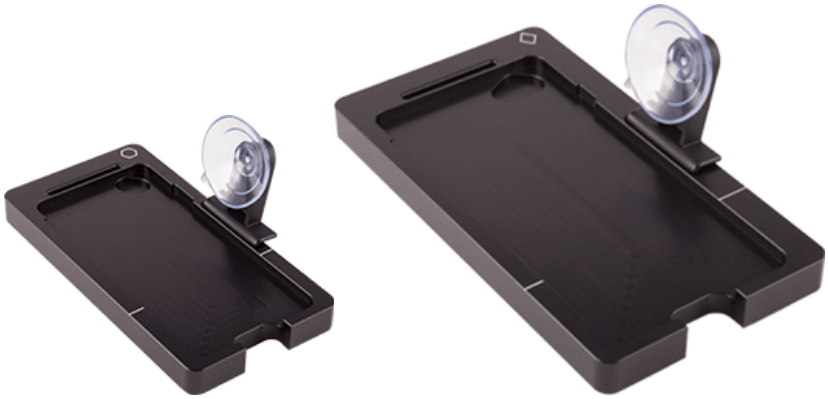
- ESD-safe brush (922-9918)
- ESD-safe tweezers
- ESD-safe wrist strap
- ESD-safe workstation
- 4.7-inch Repair Tray* (923-01291)
- 5.5-inch Repair Tray* (923-01292)
- iPhone Battery Fixture (923-00065)
- iPhone torque driver (blue), 0.65 kg-fcm (923-0448)
- iPhone torque driver (gray), 0.55 kg-fcm (923-00738)
- iPhone torque driver (green), 0.45 kg-fcm (923-00105)
- iPhone torque driver kit (923-0248) includes:
  - iPhone torque driver (black), 0.35 kg-fcm
  - iPhone Torx security bit (923-0247)
  - JCIS bit (923-0246) for cross-head screws
- MicroStix bit (923-01290)
- Superscrew bit (923-01289)
- Microfiber polishing cloth
- Motorola DS4208 scanner (923-0445) for serial bar code
- Black stick (922-5065)
- Packing tape (provides a smooth surface for removal of the display)
- SIM removal tool (922-8417) or paper clip (size #1)
- Universal Display Removal Fixture (923-00066)

The following tools are required to service iPhone 6s, 6s Plus, 7, and 7 Plus only:

- iPhone 6s and 6s Plus Display Removal Fixture Adapter (923-00652)
- Display Press (661-03430)
- Display Adhesive Cutter (923-01092)

Refer to article OP1082: Hand tools for repairs for more details.

***Note:** The 4.7-inch Repair Tray is marked with a hexagon on one corner. The 5.5-inch Repair Tray is marked with a diamond on one corner.



Device Safety

Battery Handling

iPad, iPhone, iPod, and Apple Watch include a lithium-polymer rechargeable battery. The battery, when used and repaired under reasonable conditions and according to instructions, should not present a health hazard. The contents of the battery are encapsulated. However, if the contents are released or damaged, they may present potential health and safety hazards. Avoid exposure to heat and open flame. Do not puncture, deform, crush, or incinerate, as a thermal runaway reaction and excessive heating may result. Refer to article OP24: Safely handling lithium batteries and lithium battery-powered devices. For workstation setup and special battery handling tools refer to the Workstation and Special Tools section of article OP685: About embedded battery safety.

Warning: If the battery is dented, punctured, swollen, or otherwise damaged, then stop the repair. Do not remove the battery from the device. Replace the whole unit.
For further instructions about swollen batteries, including warranty coverage, refer to article HT204762: Enclosure separation due to expanded battery.

Warning: Do not reuse or reinstall a loose battery or a battery that has been removed. Replace it with a new battery. If a new battery is unavailable, replace the whole unit.

Thermal Runaway Events Involving Lithium-Ion (LiO) / Lithium-Polymer Batteries

The following statements are intended for guidance purposes only. Only properly trained and equipped personnel should respond to a thermal runaway event.

The most effective way to prevent a lithium-ion/lithium-polymer battery thermal event is to discharge the battery before opening the device or working on or near the battery. (A battery with a charge of less than 25% will be unable to produce a thermal event.)

If a battery begins to emit smoke or sparks, or if you hear hissing or popping sounds, the battery is most likely undergoing a thermal runaway. The most effective way to stop the reaction is to smother it IMMEDIATELY with plenty of clean, dry sand. As soon as you notice that a battery thermal event is underway, pour all of the sand, all at once, over the battery to cover it completely. This will smother the reaction and limit the amount of smoke produced.

Do not attempt to use water or an ABC/CO2 fire extinguisher on a thermal runaway battery, as these will not be effective at stopping the reaction and will create a bigger mess to clean up.

Cleanup

Sweep up sand (if used), remove any pieces of debris, and return the remaining clean sand to the quick-pour container for future use. Add more sand to the container from supplementary sand containers as needed.

Wipe down the workstation with water. Use an ESD mat cleaning solution on the affected area.

Return batteries (including any debris removed from the sand, if it was used) according to Apple Recycles and scrap procedures.

Personal Protection

Respiratory Protection	Not necessary under normal conditions.
Eye/Face Protection	Wear safety glasses with side shields when working with lithium-ion batteries.
Gloves	Not necessary under normal conditions. Use disposable latex or nitrile gloves if handling an open or leaking battery.

First Aid Measures

Inhalation	The contents of an open battery or the smoke from a thermal runaway event may cause respiratory irritation. Leave the area if necessary for comfort. Seek fresh air and medical attention if feeling unwell.
Ingestion	Ingestion of a lithium-ion battery is highly unlikely as the contents are mostly solid, and any free liquid (ester-based electrolyte) that might drip out of a damaged battery is limited to a few drops. However, care should be taken not to touch fingers to mouth while handling a damaged battery to avoid any ingestion of contents. Do not induce vomiting. Wash out mouth with water. Get medical attention following exposure or if feeling unwell.
Skin Contact	The contents of an open battery may cause skin irritation. Flush contaminated skin with plenty of water. Remove any contaminated clothing. Continue to rinse for at least 15 minutes. Get medical attention. Wash clothing before reuse.
Eye Contact	The contents of an open battery may cause eye irritation. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 15 minutes. Get medical attention if irritation persists.

Disclaimer: The above information is provided for your information only. The information and recommendations set forth above are made in good faith and are believed to be accurate as of the date of preparation. Apple Inc. makes no warranty, either expressed or implied, with respect to this information and disclaims all liability from reliance on it.

Broken Glass Handling

iPad, iPhone, iPod, and Apple Watch displays and iPhone 4 and 4s back covers are made of glass. This glass could break if the device is dropped on a hard surface, receives a substantial impact, or is crushed, bent, or deformed. If the glass chips or cracks, do not attempt to remove the broken glass. Follow these steps:

- If the display glass is broken, put on safety glasses and cut-resistant gloves.
- Use a vacuum to remove any shards present on the work surface or the display.
- Affix a protective display cover or packing tape before removal to prevent injury or scattering of glass.
- Do not let the display cover or tape go over the edge of the display.
- For repair options, refer to the appropriate Visual/Mechanical Inspection (VMI) Guide:
  - VMI Guide for Apple Watch
  - VMI Guide for iPad
  - VMI Guide for iPod touch (5th and 6th generation)
  - VMI Guide for iPod nano (6th and 7th generation)
  - VMI Guide for iPod (all other models)
  - VMI Guide for iPhone 4 and 4s
  - VMI Guide for iPhone 5, 5c, 5s, and SE
  - VMI Guide for iPhone 6, 6 Plus, 6s, 6s Plus, 7, 7 Plus

Recent changes to this procedure:

6 APR 2017: Added iPad, iPod, and Apple Watch to this document. Added links to OP24 and OP685 to the Battery Handling section.

3D Touch Calibration Fixture Setup

This procedure should only be performed by Apple-certified technicians at authorized locations that have a 3D Touch Calibration Fixture.

The 3D Touch Calibration Fixture is intended to calibrate the 3D Touch and proximity sensor for iPhone 6s, 6s Plus, 7, and 7 Plus.

Follow the instructions below to set up and validate the 3D Touch Calibration Fixture.
Important: This process will require two people to complete. Do not attempt it alone.

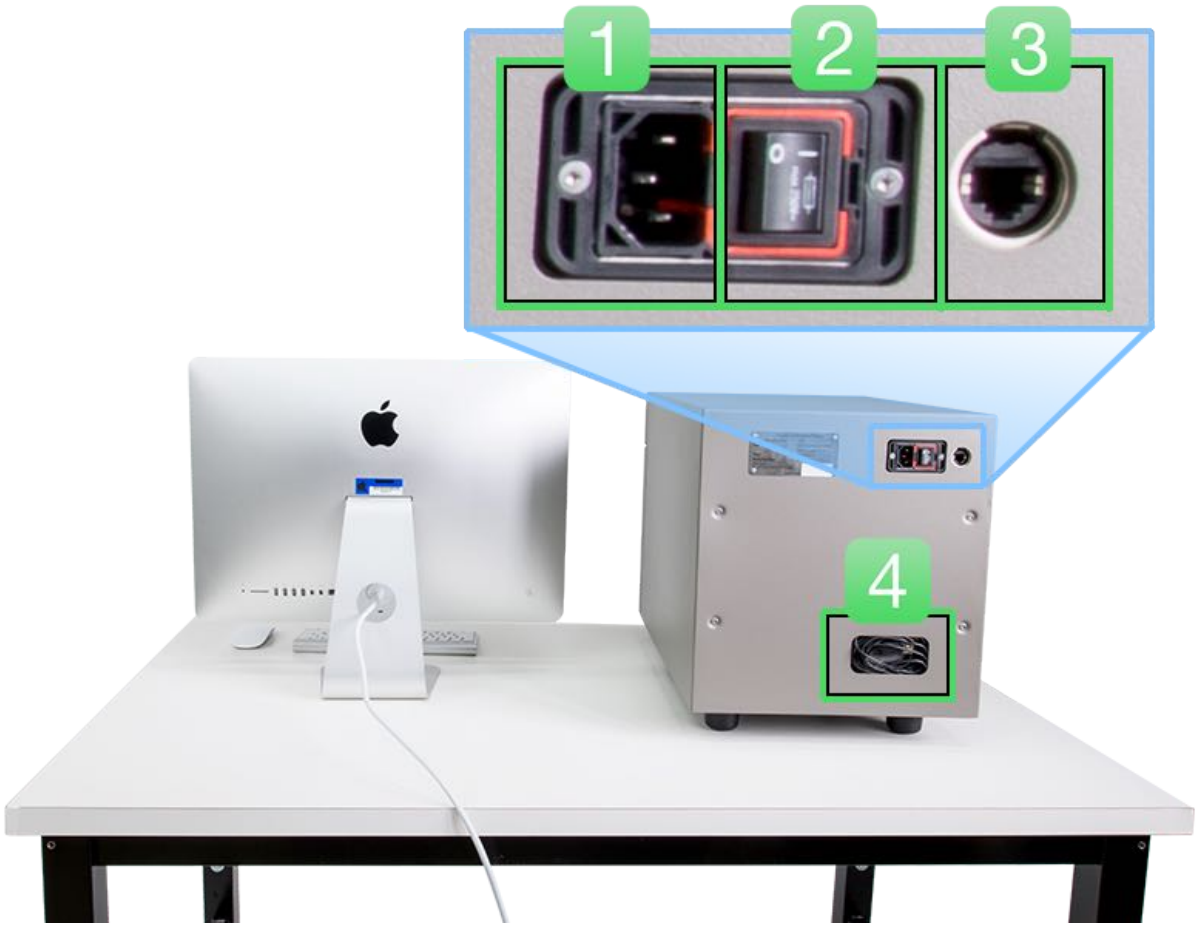
Caution: Do not touch any components located inside the 3D Touch Calibration Fixture. Finger oils cause test anomalies.

Required Tools

- 3D Touch Calibration Fixture
- Accessory kit (076-00119)
    - Thunderbolt to Ethernet adapter (661-6584)
    - CAT7 Ethernet cable
    - Power cable **Note:** 50/60Hz AC required, 90–240V AC
- iMac 2014 or later (with Thunderbolt, 8GB memory, and 500GB storage)
- Power strip
- Self-supplied Ethernet cable (for iMac internet connection)
- Troubleshooting Unit

Back View of 3D Touch Calibration Fixture

1. 110V/220V power socket
2. On/off switch with built-in fuse
3. Ethernet port
4. USB cable



Fixture Setup

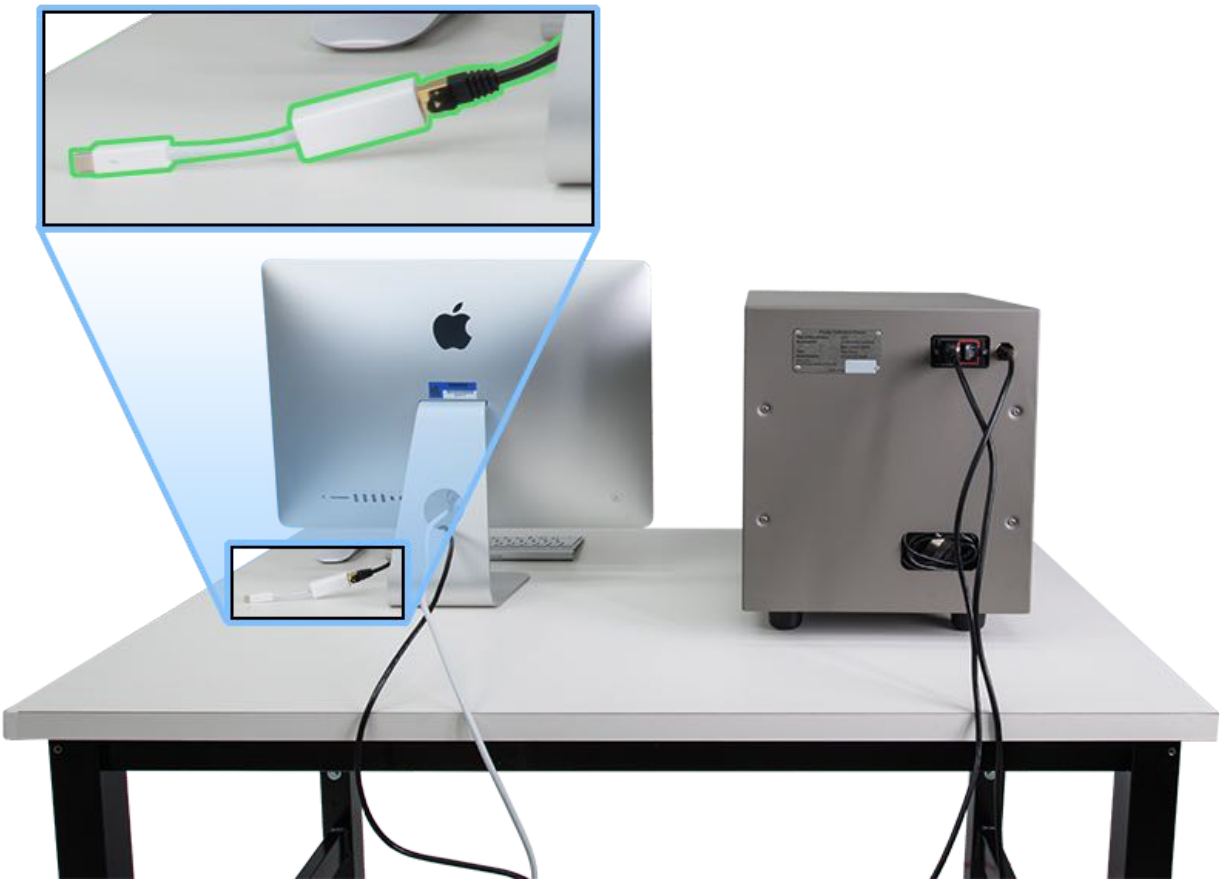
1. **Warning:** Moving the fixture requires two people; do not attempt to move it alone. Remove the equipment from the shipping package, ensuring that the arrow on the box is pointing up before opening. The fixture should be upright at all times. Open the box from the top and remove the fixture by lifting from the side, using the finger indents under the bottom edge of the fixture. Do not lift the fixture from the front or back. Place the fixture where all the sides are accessible.

2. Place the 3D Touch Calibration Fixture on the counter workspace, close to the iMac running the 3D TouchCal software. **Note:** The back of the fixture must be at least three inches (7.7 cm) away from any object or the wall. Do not position the fixture where access to the door or the buttons is obstructed. **Important:** Do not place anything on top of the fixture during operation, as this will cause a calibration failure.

3. Identify the side of the fixture that is opposite the front door (the rear side).
4. Open the accessory kit.
5. Connect the power cable to the power socket on the back of the fixture.

6. Connect the Ethernet cable to the Ethernet port on the back of the fixture. **Important:** Only use the Ethernet cable included in the accessory kit.

7. Connect the Ethernet cable to the Thunderbolt to Ethernet adapter. **Important:** To function properly, the fixture must be connected to the computer with the Thunderbolt to Ethernet adapter.



8. Connect the Thunderbolt to Ethernet adapter to an available Thunderbolt port on the Mac. **Important:** The ethernet port on the Mac should be used to connect the Mac to the internet. Do not connect the fixture ethernet cable to the ethernet port on the Mac.

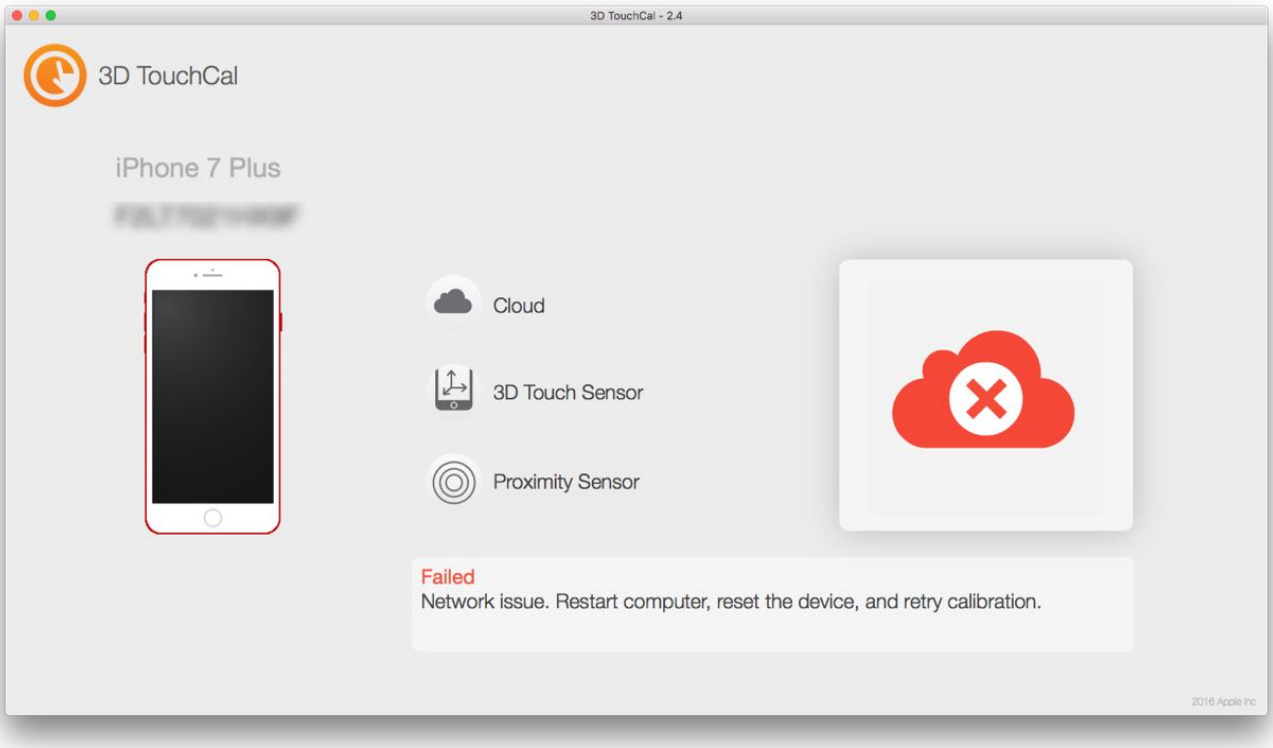
9. Unwrap the USB cable stored within the open cavity in the lower right corner of the back of the fixture.
10. Connect the black USB cable from the back of the fixture to an available USB port on the Mac.

11. Plug the 3D Touch Calibration Fixture into a site-supplied power strip using the power cable from the accessory kit.
12. Turn on the fixture. **Note:** The door must be closed before turning on the fixture. The alarm light will illuminate if the door is open.
13. Refer to article OP1788: 3D Touch Calibration Repair Station for software installation instructions.

Setup Verification
To verify that the fixture is set up and ready to perform customer repairs, calibrate a Troubleshooting Unit. **Note:** Do not replace the display of the Troubleshooting Unit. The display does not need to be replaced to test the 3D Touch calibration fixture. If the store does not have a Troubleshooting Unit, then contact ACS.

- Refer to article TP1548: 3D Touch Calibration Procedure to calibrate a test iPhone.

Important: The calibration is expected to fail when using the Troubleshooting Unit. The error below will appear.



When the calibration fails contact ACS to confirm that the fixture setup is complete.

Technical and Operational Information:

Electrical: 90–240V AC, 50/60Hz, Current: 5.0A max
Dimensions:

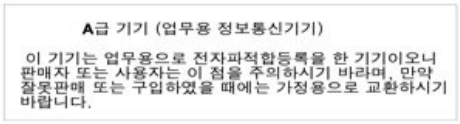
Length: 342.9 mm (13.5 in.)
Width: 457.2 mm (18 in.)
Height: 391.2 mm (15.4 in.)

Nominal weight: 41.7 kg (91.2 lb.)
Exposure: IPX0 (not protected against water ingress)
Temperature: 15° C to 28° C (59° F to 82.4° F)
Relative humidity: 0 to 85% non-condensing
Altitude: -500 to 2000 m (-1640 ft. to 6562 ft.)

Label	Definition
	Hand crush hazard
	Electric shock hazard

Apple 3D Touch Calibration Fixture
Manufactured in Italy
Apple Inc.
1 Infinite Loop
Cupertino, CA 95014
USA

For Korea only:



Creating a Carry-In Repair for iPhone display repairs

Topic

Use this procedure for creating a Carry-In Repair for iPhone display repairs.

Pilot locations only: This procedure is for locations piloting Carry-In iPhone display repairs only.

1. Overview

This procedure is the starting point for repairing an iPhone display. Technicians provide repairs for iPhone to help customers get their device repaired quickly, and without having to activate or restore their phone from a backup.

- Make sure the workstation and technician are properly grounded using ESD precautions (OP100).
- For an iPhone with a swollen or expanded battery, see Safely handling lithium batteries and lithium battery-powered devices (OP24) and Embedded Battery Safety (OP1761).
- For iPhone repairs with mixed failure or third party parts, see How to process a mixed-failure repair (OP1745).
- Perform Micro-Inspection when an iPhone 6 or newer model has a display replacement – see iPhone Display Micro-Inspection Procedure (TP1587).
- If the customer has a Third Party Part (TPP) display, explain that they will need to pay the out-of-warranty cost to replace the TPP component in order to resolve the functional issue. If the same-unit repair fails or is not available, the customer will be required to pay the out-of-warranty cost of the whole unit replacement. For more information, see Servicing an Apple product that contains a third party component (OP1800).
- iOS 10 or later is required to perform display repairs. Offer to help the customer upgrade if their device if they are using an iOS version earlier than iOS 10.

Important: Display calibration software requires the publicly released version of iOS. Perform a DFU Restore before attempting a display replacement and calibration for iPhones running beta or SDK versions of iOS.

Only attempt a same unit repair when you can also provide a whole unit replacement. This is necessary in case the repair is unsuccessful and you need to provide the customer with a whole unit instead. Before offering a component or modular repair verify a correct model of the '661' whole unit part is available and look at the activation details to confirm their iPhone is tied to a regional carrier or is unlocked. A customer may opt to pay for an out of warranty device replacement.

Protect customer information during service: Protecting personal passwords and information is of the utmost importance. When checking a device in for service, discuss with customers the following options so they are aware of how they can protect their information.

- Before service: See Get your iPhone, iPad, or iPod touch ready for service (HT201557)
- During check-in:
  - Customers with devices running iOS 10.3 or later:
    - Perform troubleshooting with the customer present and use Diagnostics Mode (TP1570) after the device is repaired. Do not ask a customer for their iOS passcode and do not record their passcode if provided.
  - Customers with devices running iOS 10.2.1 or earlier:
    - Offer to help the customer upgrade.
    - Alternatively, customers may create a temporary passcode (HT204060) so the current passcode is not shared. When a customer chooses to set up a temporary passcode or account, be sure to remind them to reset their passcode or delete the account once service is complete.
  - Any iOS version:
    - If preferred, customers can back-up and erase their iOS device (HT201351) so their personal information is not present during repair.
  - For iPhones that are paired with an Apple Watch, see About Activation Lock on your Apple Watch.
- **Note:** In the event the iPhone must be replaced (not repaired), explain to the customer their original device must be erased when they accept the replacement iPhone. This ensures the customer's information is no longer on the original device.

Customers have the option of removing their passcode lock to proceed with the repair. When the SIM PIN is enabled, all network connectivity is disabled, preventing a test call to verify the successful completion of the repair. See iOS: Using passcodes (HT4113) and iOS: Understanding the SIM PIN (HT1316) for detailed instructions.

Note for Japan: For devices in Japan, be sure to have the user remove any Suica card from Apple Pay before proceeding with service

Bent enclosure - You may attempt a display repair for an iPhone with a bent enclosure - the 'wobble test' no longer determines reparability. Do not attempt a display repair if the enclosure is bent more than what is shown in the VMI Damage Classification Guidelines.

2. 3D Touch Calibration Fixture Setup (Hardware)

The 3D Touch Calibration Fixture is intended to calibrate the 3D Touch and proximity sensor for iPhone 6s, 6s Plus, 7, and 7

Plus. For information about setting up the hardware, see 3D Touch Calibration Fixture Setup (TP1547).

The following are best practices for using the 3D Touch Calibration Fixture:

- Periodically clean lightning cable of calibration fixture with an IPA wipe.
- Remove debris from lightning port of iPhones.
- Keep fixtures free from vibrations.
- Do not attach, lean, store, or place anything on the fixture at any time.
- When handling the display service part, hold it by the edges and peel the plastic lining of the new display down, **not away** from the metal shielding.
- Only plug the 3D Touch Calibration Fixture into the iMac.

3. 3D Touch Calibration Fixture Setup (Software)

For information about setting up the software, see 3D Touch Calibration Repair Station (OP1788).

4. Creating Display Repairs in GSX

Customer must turn off Find My iPhone before the repair is created. See Find My iPhone Activation Lock (HT201365).

A. Running a Diagnostic and Functional Test

- Run AST 2 for iOS (TP1267) and a Functional Test (TP1045) before and after the repair to verify that the issue has been resolved and to ensure that there are no other functional failures on the unit.
- If the device's issue prevents you from running a diagnostic and/or functional test, indicate in the "Repair Notes" field why.
- Verify the reported display failure before initiating the display repair in GSX. Also, verify there is no other functional failure on the unit. If another functional failure is found follow How to process and mixed-failure repair (OP1745).

B. Initiating a repair in GSX

1. To begin the repair creation process, select the New Repair button at the top of the GSX homepage, or you will be prompted to create a repair after completing Integrated Troubleshooting.

Important: If you have multiple technicians at a site, the technician associated with the GSX repair should be the technician putting on the new display.

2. A prompt will appear asking you to select the "Customer-reported symptom and issue" at the beginning of repair creation. For example, if a customer states their device is cracked, select "Display" as the symptom and "Multiple Cracks" as the issue.

To see a list of symptoms you can perform a display replacement for, search GSX for "iPhone display replacement process".

3. Additionally, repair strategy may be determined based on answers provided for prompted questions.

4. The benefits of correctly answering questions during repair creation:

- For customers: Optimum performance from Apple products, the most accurate and streamlined repair strategy for the issue, quick turnaround time.
- For technicians: Correct compensation, fewer loopers, valuable feedback, technician insights, providing a feedback loop, data collection for future product/programs.

5. Please note that repair strategy may change during repair creation depending on data added. Based upon information entered when creating the repair, GSX may display a message that a specific repair strategy is unavailable.

5. Adding Display Parts to GSX

A. The relevant parts will populate based on the issue derived from the guided troubleshooting. These parts can be overridden if needed. Sometimes the correct part you need will not display. You can proceed without selecting a part from this page.

B. If additional parts are needed to complete the repair or the display part didn’t populate, click the Add Part button to manually add parts. For Consumer Law Refund or Replace service types, only applicable parts will be available to be selected.

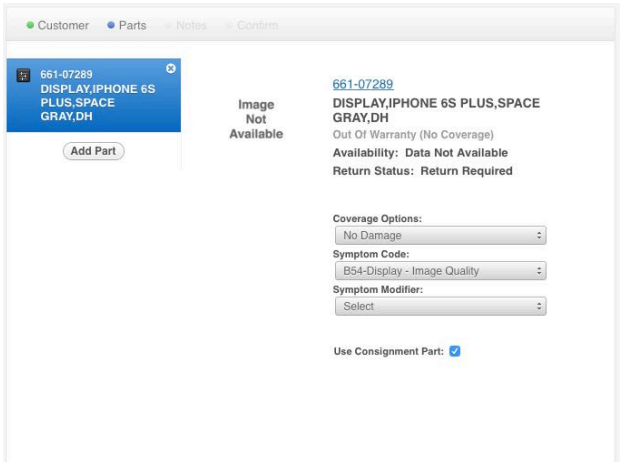
For in-warranty and AppleCare+ devices:

Select **No Damage** as the coverage option for non-damage related issues. Select **Returnable Damage** as the

coverage option for physical damage like a cracked screen.

For out of warranty devices:

Select **No Damage** as the coverage option for both non-damage and physical damage like cracked screens.



C. Any part added during the repair creation process may be removed during the order parts process.

Note: If you receive a “No Parts Found” error message (red banner along the top of GSX), dismiss the banner and click the Next button in the lower right corner to continue creating the repair.

D. For the **KBB Serial Number** enter the new display service part serial and delete the last digit from that number. For the **KGB Serial Number** enter the new display service part serial.

E. Click **Next**.

Note: To ensure the right part is selected, confirm the ring around the home button matches the color of the enclosure.

6. Repairing and Calibrating iPhone Displays

A. Repairing the device

1. iPhone 6s

- Open Device (RP1264)
- iPhone 6s Open Device Video (SV284)
- Replace Display Assembly (RP1266)

2. iPhone 6s Plus

- Open Device (RP1258)
- iPhone 6s Plus Open Device Video (SV285)
- Replace Display Assembly (RP1260)

3. iPhone 7

- Open Device (RP1326)
- iPhone 7 Open Device Video (SV311)
- Replace Display Assembly (RP1332)

4. iPhone 7 Plus

- Open Device (RP1333)
- iPhone 7 Plus Open Device Video (SV317)
- Replace Display Assembly (RP1339)

B. Calibrating Device - After installing the service part display on the customer's iPhone, the next step is to calibrate the device. You must calibrate the new display to the iPhone's main logic board. If the display calibration fails, see Section 7, Troubleshooting Failures.

Important: It is required for the technician to have the repair open in GSX and add a display part to the repair before calibration. Not having the repair open with a display part will cause a failure in the calibration process. For more information about adding a display part, see Section 5.

7. Troubleshooting Failures

During the course of a repair there may be issues with the repair, which result in a change of the original repair quote. This may require a whole unit replacement. Before every iPhone repair, it is important to set proper expectations with the customer of the possibility of a requote. Include in the notes what the customer has approved to repair.

Examine an iPhone for additional issues by running diagnostics and performing a functional test. Diagnostics and a functional test should be completed before and after the repair to verify that the issue has been resolved.

If you are unable to complete the modular repair, you must answer the question in the Troubleshooting section of the repair record. Select the most accurate reason preventing you from completing the repair.

1. **A. Visible failures before calibration** - After installing the replacement display, if you see issues with the display (e.g., lines in the display) then take the follow steps before calibrating the iPhone:

    1. Reseat the display cables

    2. If the issue is still not resolved, attempt a second display. If the second display has no visible issues, mark the first display used as DOA. A new display service part should be added to the repair. For the new display service part part, use the same compTIA as the first display part and continue the repair.

    3. If the second display also has visible issues, the iPhone is unrepairable. Remove the second display and return it to inventory. Place the first display attempted on the iPhone and mark the repair complete.

    See section C, Display fails a third calibration attempt, for instructions on creating a second repair.

B. Fails the initial calibration - If the initial calibration fails, try these best practices using the display part:

- Make sure you and the workstation are properly grounded using ESD precautions (OP100).
- Read the 3D Touch Calibration Procedure (TP1548) to make sure the fixture is working properly and that you are following the most current instructions for performing the calibration.
- Follow the instructions of the calibration software. **Note**: If calibration fails, the phone may be in recovery mode. This is expected. You can attempt calibration again with the phone in recovery mode.
- Display calibration software may prompt the technician to use a second KGB display.
  Note: Make sure to DOA the first display used and add the new display service part. For the new display service part, use the same compTIA as the first display service part.
- Reseat display cables and hard-reset the device. Attempt to calibrate the device again.

Note: A maximum of two displays should be used for calibration. There is only one exception when you should use a third KGB display on a repair. If a second display was used because of visible failures before calibration, a third display may be used if the 3D Touch Calibration software prompts you to try another display.

C. Display fails a third calibration attempt

1. In Warranty or AppleCare+ display failure - If a display calibration fails and there is no additional damage preventing the ability to perform the repair, mark the display repair complete in GSX. Create a second repair and replace the device in-warranty. Classify the issue as **Calibration Unsuccessful**.

Note: The customer is responsible for any charges on the first repair unless third party modification is found. See Section 7.C.3, **Third Party Modification**.

China, Hong Kong, and Taiwan only:

a) If the display repair fails, complete the display repair in GSX and charge the customer the quoted price.

b) ACS will provide a credit for this Display Repair. No escalation is needed. The display service part used will stay on the device and a mail-in repair will need to be created.

c) Create a Mail-In repair and Select **Display** as the Reported Symptom and **Calibration Unsuccessful** as the Reported Issue.

d) Mark **No Damage** as the coverage option. The repair center will either repair or replace the device at the appropriate cost unless third party modifications are found.

2. Out of Warranty Display Failure - When an iPhone is out of warranty, and the display calibration fails with no additional damage preventing the ability to perform the repair, then you will be able to offer the customer a whole unit replacement for the price of a display repair.

a) Complete the display repair in GSX

b) Transact the original repair for the cost of the display.

c) Create a second repair for a whole unit replacement.

d) Select **Display** as the Reported Symptom and **Calibration Unsuccessful** as the Reported Issue.

e) Select **No Damage** as the coverage option. Do not charge the customer and transact the repair for the whole unit replacement.

f) ACS will provide a credit for the whole unit replacement. No escalation is needed.

China, Hong Kong, and Taiwan only:

a) If the display repair fails, complete the display repair in GSX but do not charge the customer.

b) ACS will provide a credit for this Display Repair. No escalation is needed.

c) The display service part used will stay on the device and a mail-in repair will need to be created.

d) Create a mail-in repair and Select **Display** as the Reported Symptom and **Calibration Unsuccessful** as the Reported Issue.

e) Mark **Display Only service** as the coverage option. The repair center will either repair or replace the device at the appropriate cost unless third party modifications are found.

3. Third party modifications

a) Complete the display repair in GSX

b) Do not charge the customer and transact the display repair.

c) ACS will provide a credit for the display repair. No escalation is needed.

d) Create a second repair for a whole unit replacement. Select **Display** as the Reported Symptom and **Calibration Unsuccessful** as the Reported Issue.

e) If the device is In Warranty by time - mark **Returnable Damage** as the Coverage Option. If the device is Out of Warranty by time - mark **No Damage** as the Coverage Option.

f) Charge the customer for a whole unit replacement.

China, Hong Kong, Taiwan only:

a) Complete the display repair in GSX

b) Do not charge the customer and transact the display repair.

c) ACS will provide a credit for the display repair. No escalation is needed.

d) Create a mail-in repair and Select **Display** as the Reported Symptom and **Calibration Unsuccessful** as the Reported Issue.

e) Mark **Flat Rate** as the coverage option. The repair center will either repair or replace the device at the appropriate cost.

D. Multiple Issues Found - You may discover multiple failures as a result of diagnostics during the creation of a repair or before you've started the repair. In this situation, select the issue that has the greater impact on the iPhone functionality when classifying the repair. Reference How to process a mixed-failure repair (OP1745) for more information.

You may also discover another failure through post-repair diagnostics or after completing calibration. For these situations, you can list more than one component part in the repair quote if the failure can be resolved with an additional same unit repair (SUR).

If the additional failure requires a whole unit replacement, follow the steps below:

1. Complete the display repair in GSX.
2. Transact the original repair for the cost of the display.
3. Create a second repair for a whole unit replacement.
4. Select **Display** as the Reported Symptom and **Calibration Unsuccessful** as the Reported Issue. From the drop-down menu, select **Multiple Failures Found.**
5. Select **No Damage** as the coverage option. Do not charge the customer and transact the repair for the whole unit replacement.
6. ACS will provide a credit for the whole unit replacement. No escalation is necessary.

Changing coverage - Physical damage is not covered by warranty and any parts affected by that damage must be quoted as out of warranty. This requires the technician to carefully classify the repair and even change coverage for the parts quoted. For example, the customer reports the speaker is not functioning for an iPhone that is under warranty. The iPhone has a damaged screen which must be replaced to perform the speaker repair. In this case, the display should be quoted out of warranty, and the speaker assembly will be covered by the iPhone's limited warranty.

Note: Service providers will be billed for incorrect warranty classifications of customer displays.

Swap Repair becomes necessary - When the reported issue can be serviced by a modular repair but additional damage prevents access to replace that component, explain this to the customer. If the additional damage prevents completion of a modular repair you must quote a whole unit replacement (e.g. multiple cracks to the display and a dented enclosure prevents access to successfully replace the Vibe Motor).

E. Fixture Downtime - If the 3D Touch Calibration Fixture is experiencing downtime, you will be able to offer the customer a whole unit replacement for the price of a display repair. Follow the steps below for this process in GSX:

1. Create and complete the display repair in GSX.

   Note: You will still need perform the physical display repair for this process, but it does not need to be calibrated.
2. Transact the original repair for the cost of the display.
3. Create a second repair for a whole unit replacement.
4. Select **Display** as the Reported Symptom and **Calibration Unsuccessful** as the Reported Issue. From the drop-down menu, select **Calibration Fixture Down.**
5. Select **No Damage** as the coverage option. Do not charge the customer and transact the repair for the whole unit replacement.
6. ACS will provide a credit for the whole unit replacement. No escalation is needed.

8. Verify Repair and Functional Test

Verify the repair resolved the reported issue and perform Functional Test (TP1045). If it did not resolve the issue, see Section 7.

9. Handling Parts

- Make sure to keep all the packaging from the display service part. This is needed to repackage the customers old display.
- If multiple displays were used make sure to have the correct display serial number added to the case.
- DOA Parts - When the replacement part is damaged by technician attempting the repair service, or they determine it was defective (DOA), we need to account for that action. See How to Process DOA Stock Parts (OP22).

10. Returning the product to the customer after the repair

- Make sure to clean the device before returning it to the customer. See Cleaning procedures (TP320).
- Sign - Have the customer sign for the service and close the repair.

11. AppleCare+ and AppleCare Protection Plan Considerations

Replacing a damaged display is an out of warranty repair. The exception is when an iPhone is covered by AppleCare+ for iPhone. To learn where AppleCare+ is sold and where service is available, see Selling AppleCare+ agreements in GSX (OP659)

A. AppleCare+ Incident - When the customer has AppleCare+ for iPhone, the display repair can be covered as an incident. To learn what is eligible for covered under an incident, see AppleCare+ for iPhone's terms and conditions.

B. AppleCare Protection Plan for iPhone - A damaged display is considered accidental damage which is not covered under the terms of the AppleCare Protection Plan for iPhone.

C. Consumed Battery - Batteries may be replaced at no charge for iPhones covered by an AppleCare+ or AppleCare Protection Plan when the diagnostic results indicate a defective or consumed battery.

The customer can choose a same unit repair or a whole unit repair when consuming an AppleCare+ incident. Be careful to choose the appropriate part with the correct fee (display repair part for a display replacement or non-repairable part for a whole unit replacement).

12. iPhone display repair training

Training for iPhone display repairs is available on ATLAS.

ATLAS - Phone Display Replacement and 3D Touch Calibration

13. Support from ACS

For issues with the calibration equipment, follow the steps in Troubleshooting the 3D Touch Calibration Fixture (TP1571).

ACS English Chat support is available 24 hours a day, 5 days per week (Monday through Friday) for questions about the display repair process, the calibration equipment, tools, or inventory. Other languages availability varies. Weekend ACS Chat support is available for calibration fixture issues.

Support for issues with the calibration fixture will be available 24 hours a day, 7 days per week in English and Chinese.

Note: To ensure you get to the right team for support, reference Best practices to follow when escalating to AppleCare Channel Support (OP1401).

Please ensure the following are performed before initiating a chat support to ACS:

- Create a GSX Escalations (OP580 : Creating and managing escalations in GSX)
- Choose the correct Issue Category
- Provide the following details in the escalation notes:
- Fixture Serial Number
- Error Message
- Issue observed
- Images of failure
- Images of Network settings
- Initiate a chat support with GSX Case ID, see Best practices/Selecting correct issue category for ACS Chat (OP1514)

Note: If you are having trouble with the calibration machine and/or iMac, it is best to use a separate computer for contacting ACS.

Important: For the best customer experience do not send the customer to the Apple retail store.

14. Returning KBB 3D Touch Calibration Fixture

For information about how to pack the KBB Fixture, see Instructions for packing Display Calibration Fixtures for return (OP1830).

Should you have any issues with returning or acknowledging the consignment order, raise a normal consignment escalation as outlined in OP580 (United States, Canada, Latin America, Europe only) and OP1514.

3D Touch Calibration Repair Station

Topic

Follow this procedure when imaging the Mac used with the 3D Touch Calibration fixture.

Pilot locations only: This procedure is for locations piloting Carry-In iPhone display repairs only.

1. Overview

The 3D Touch Calibration Fixture is intended to calibrate the 3D Touch and proximity sensor for iPhone 6s, 6s Plus, 7, and 7 Plus.

Follow the instructions below to set up and validate the 3D Touch Calibration Fixture.

2. Installing the 3D Touch Calibration software on a New Fixture Station

A. Setup a Mac (2014 or later) with a clean installation of macOS (10.12.4 or later).

B. Create an administrator user account with a password.

C. Download the following installation packages from GSX article OP1788 and place them on the desktop of the fixture station Mac.

1) MatlabRuntime

2) 3D Touch Calibration

3) 3D Touch Calibration Support Software

D. Install the packages on the clean macOS (10.12.4 or later) fixture station. When prompted, enter the administrator username and password. **The packages must be installed in the following order:**

1) 1_MatlabRuntime_ASP **(Right click, choose Open)**

2) 2_3DTouchCal-ASP

3) 3_3DTouchCal_SupportSoftware-ASP

Notes:

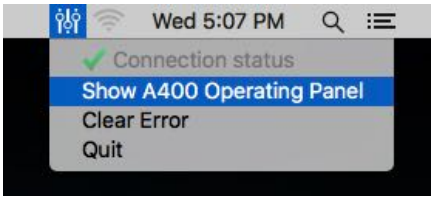
- 3D TouchCal can only run on macOS (10.12.4 or later)
- The installation order is significant and must be followed.

E. Verify the calibration fixture is correctly connected to the fixture station computer and that the calibration fixture is powered on. See 3D Touch Calibration Fixture Setup (TP1547).

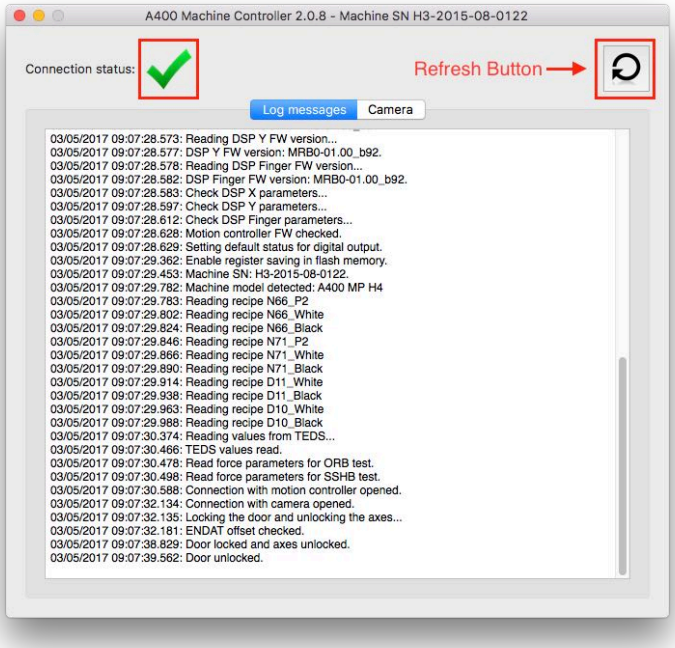
F. Restart the computer.

G. Log in to the administrator user.

H. After 30 Seconds, the A400 Panel should launch and show on Menu bar. Open A400 Panel by clicking its icon on menu bar and choosing “Show A400 Operating Panel”



I. Look for green check mark in the Operating Panel window. If you do not see it, click the refresh button in the operating panel. It could take up to 15 minutes for the green check mark to appear. Do not restart the computer or fixture while waiting for the green check mark.



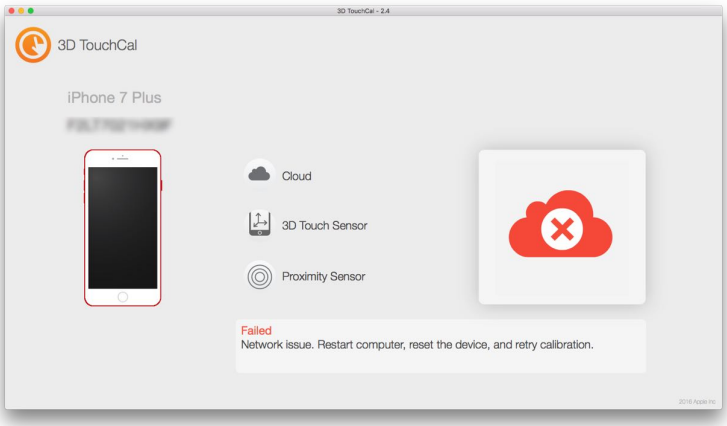
J. Launch the 3D TouchCal.app from the Applications folder.

3. Verification

A. Test calibration on the fixture - Run your Troubleshooting Unit on the new 3D TouchCal fixture station to validate installation was successful. If your location does not have a Troubleshooting Unit, contact ACS.

Note: Do not replace the display of the Troubleshooting Unit. The display does not need to be reaplaced to test the 3D TouchCal fixture station.

Important: The calibration is expected to fail when using the Troubleshooting Unit. The error in the image below will appear.



B. Contact ACS to confirm fixture station - When the calibration fails, contact ACS to confirm that the fixture station is verified for use for display replacements.

4. Upgrade or Reinstall Software on a Fixture Station

In situations where a fixture station has previously been set up and you are required to upgrade or reinstall the package, the required software packages can be found in GSX article OP1788. Please note that only two of the three packages are required for an upgrade.

A. Log in as an administrator on the fixture station.

B. Verify the 3DTouchCal application is not running.

C. Download the following installation packages from GSX article OP1788 and place them on the desktop of the fixture station Mac.

1) 3D Touch Calibration

2) 3D Touch Calibration Support Software

D. Install the packages on the fixture station. When prompted, enter the administrator username and password. **The packages must be installed in the following order:**

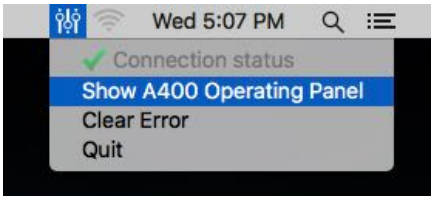
1) 2_3DTouchCal-ASP

2) 3_3DTouchCal_SupportSoftware-ASP

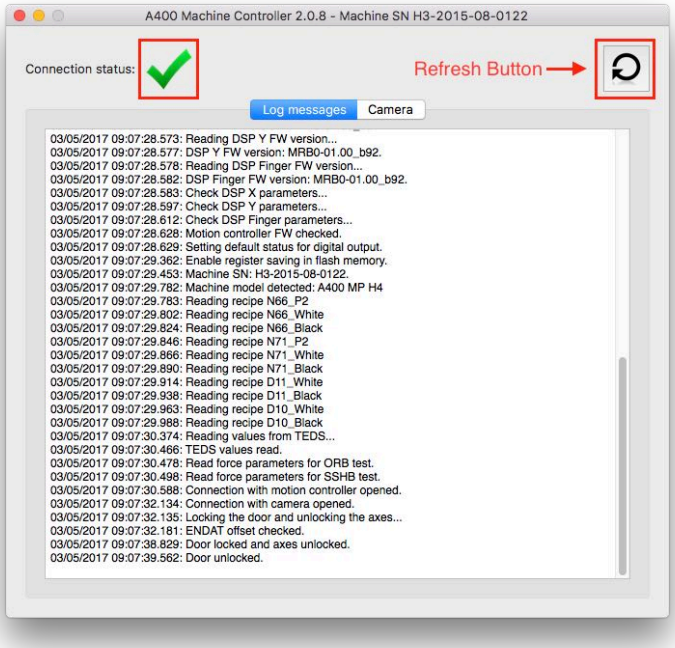
E. Restart the fixture station computer.

F. Log in to the fixture station computer.

G. After 30 Seconds, the A400 Panel should launch and show on Menu bar. Open A400 Panel by clicking its icon on menu bar and choosing “Show A400 Operating Panel”



H. Look for green check mark in the Operating Panel window. If you do not see it, click the refresh button in the operating panel. It could take up to 15 minutes for the green check mark to appear. Do not restart the computer or fixture while waiting for the green check mark.



I. Launch 3D TouchCal.app from Application folder.

Other Resources

3D Touch Calibration Fixture Setup (TP1547)

3D Touch Calibration Procedure (TP1548)

Display Replacement and 3D Touch Calibration Video (SV345)

Chat with ACS for any questions regarding the 3D Touch Calibration fixture and software image.

Troubleshooting the 3D Touch Calibration Fixture

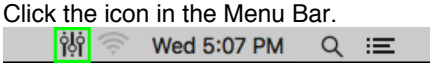
Symptoms	Quick Checks
• 3D Touch Calibration Fixture will not turn on • 3D TouchCal software will not run • 3D Touch Calibration Fixture calibration fails repeatedly • 3D Touch Calibration Fixture door will not open • 3D TouchCal software crashes	• Requirements include iMac (2014 or later), 8GB memory, 500GB storage, and an active Internet connection. • Do not connect any other devices into iMac used for calibration. • Ensure the 3D Touch Calibration Fixture door is fully closed when attempting calibration. • Try to turn the 3D Touch Calibration Fixture off then turn the fixture back on. Ensure all cables (power, USB, CAT7, Thunderbolt to Ethernet adapter) are plugged in properly. Reseat the USB to Lightning device under test (DUT) cable to iPhone. Restart the 3D TouchCal software. • Turn off and restart the iMac at the 3D Touch Calibration Fixture station. • Ensure iMac date and time are correct in System Preferences. • While calibrating, avoid causing vibrations and movement of the fixture.

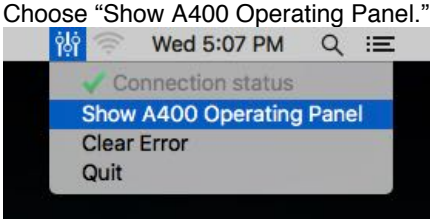
	Check	Result	Action
1	Refer to article TP1547: 3D Touch Calibration Station Setup. Ensure all instructions were followed correctly. Does the Fixture turn on? Is the LED on? 	Yes	Go to step 5.
		No	Go to step 2.
2	Try using a different power cord and power outlet. Turn on the fixture. Does the light on the front of the fixture flash red?	Yes	Go to step 3.
		No	Create a GSX Escalation, then contact ACS. Refer to article OP580: Creating and managing escalations in GSX.
3	Does the light on the front of the fixture flash red after 30 seconds then illuminate solid green?	Yes	Go to step 9.
		No	Go to step 4.

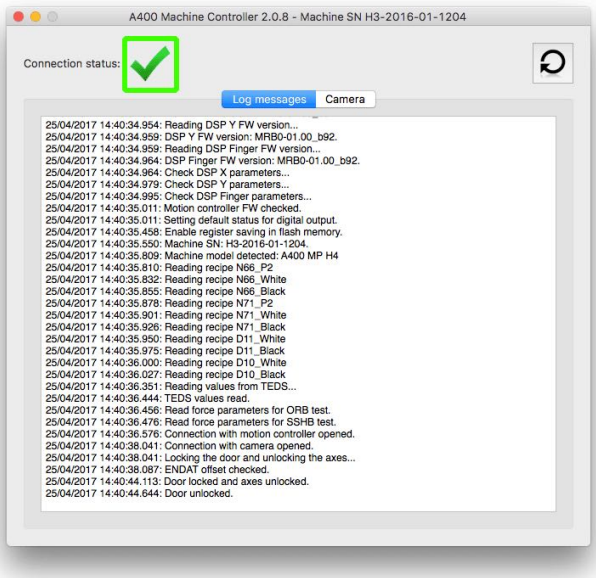
<table>
<tr><td rowspan="2">4</td><td rowspan="2">Check if EMO button is triggered by rotating clockwise.

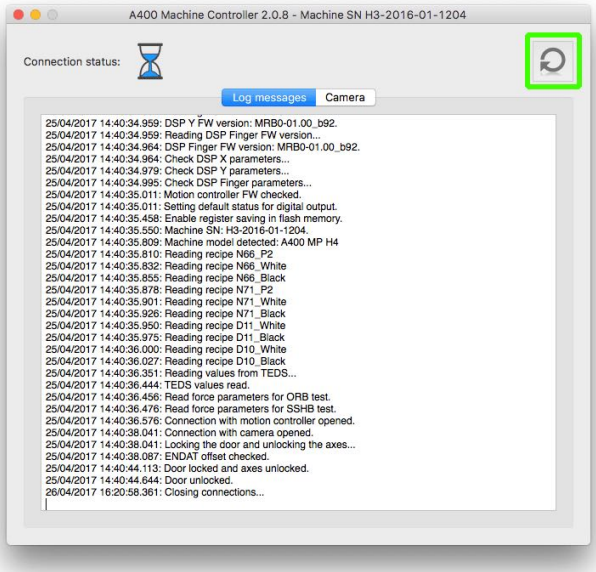
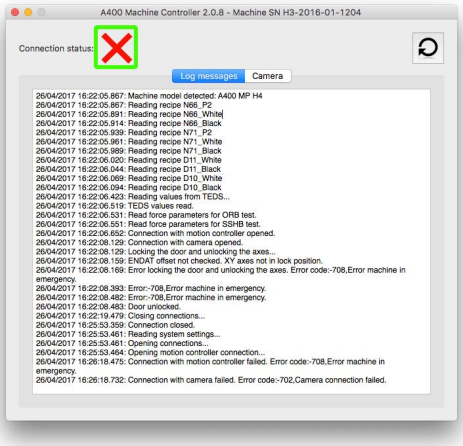
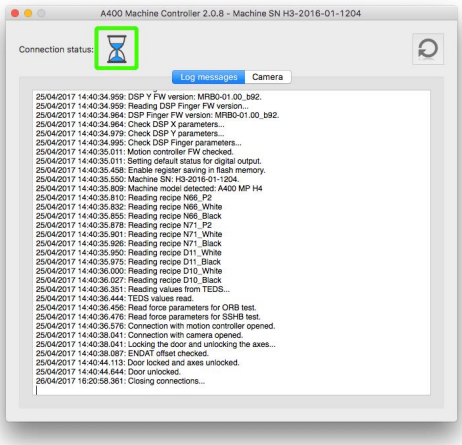
Did EMO button rotate?

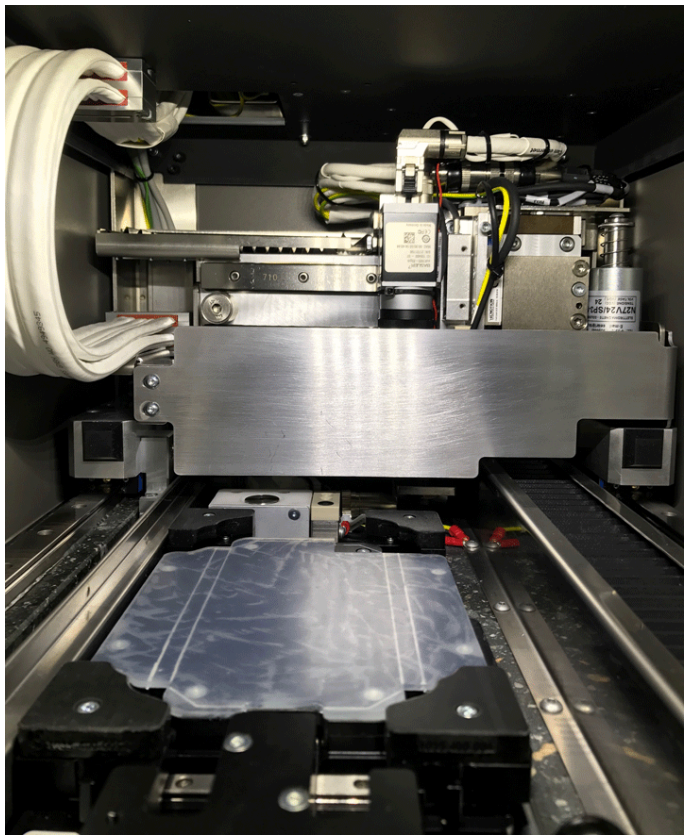
• If EMO button rotates, button was triggered.
• If button does not rotate, EMO button was not triggered.</td><td>Yes</td><td>Press and hold silver reset button on front of fixture for one second then release. Wait 30 seconds, then go to step 5.

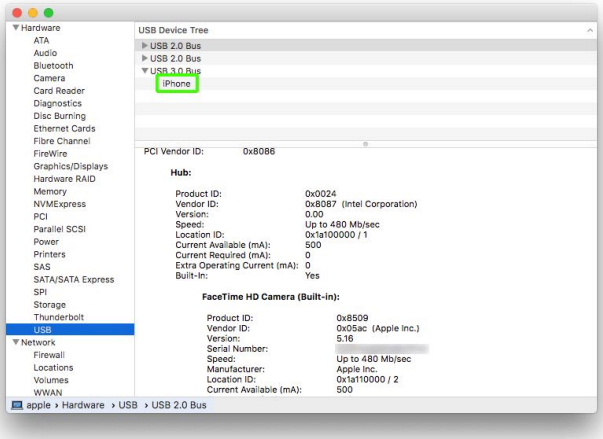
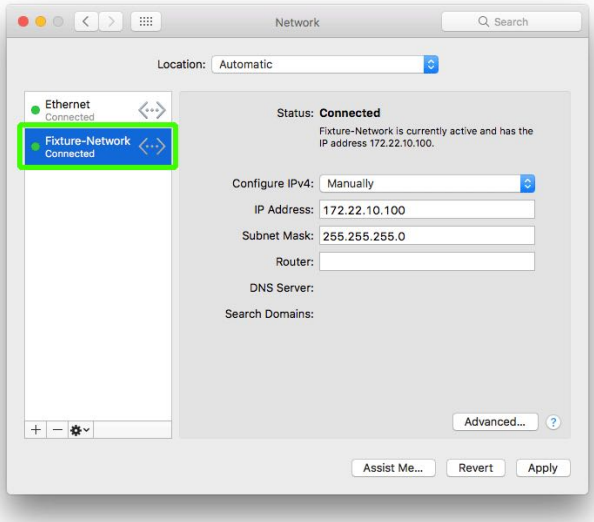
  </td></tr>
<tr><td>No</td><td>Restart fixture by toggling the on/off switch in the rear of fixture to “off” and back to “on.” If LED is illuminated green, then go to step 5. If issue persists, create a GSX Escalation then contact ACS.</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">Click the icon in the Menu Bar.
 

Choose “Show A400 Operating Panel.”
 

Does the Connection Status have a Green checkmark?
 
</td><td>Yes</td><td>Attempt calibration with Troubleshooting Unit. Go to step 17.</td></tr>
<tr><td>No</td><td>Go to step 6.</td></tr>
</table>

6	Cycle the connection status by pressing the Refresh button on the top right corner of the A400 Operating Panel. Does the Connection Status have a green checkmark after 1 minute? (The hourglass may appear for about a minute.) 	Yes	Attempt calibration with Troubleshooting Unit. Go to step 17.
		No	If A400 Operating Panel shows a Red “X” or hourglass for longer than 2 minutes, go to step 7.  
7	Press and hold the silver reset button for one second then release. Does the light on the front of the fixture illuminate solid Green?	Yes	Go to step 8.
		No	Create a GSX Escalation, then contact ACS.

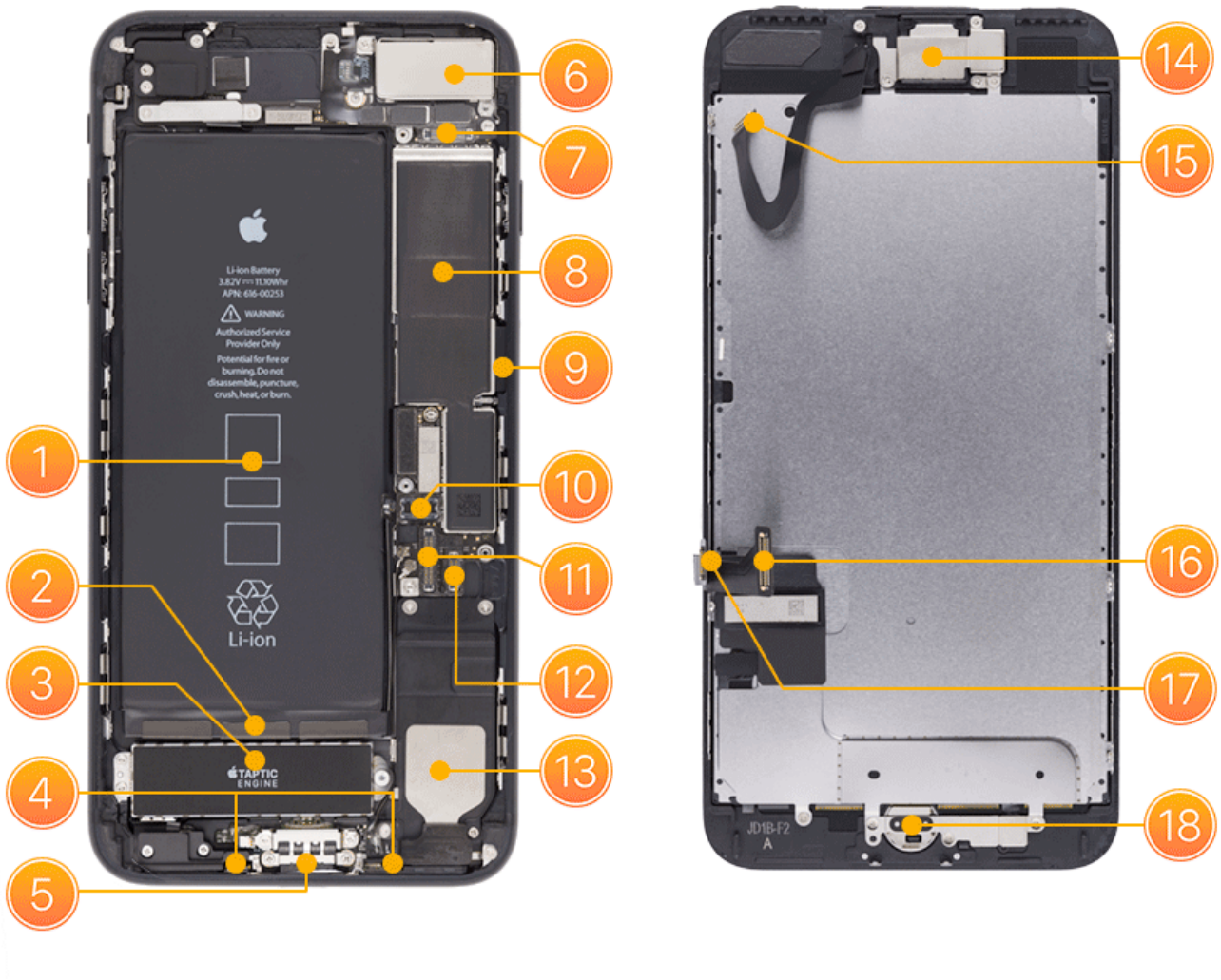
8	Observe the testing armature inside the fixture. The armature should be in the default shipping position (all the way back and to the right, locked in place). Is the testing armature all the way back in the locked position? If you are unsure create a GSX Escalation, then contact ACS. 	Yes	Go to step 9.
		No	Create a GSX Escalation, then contact ACS.
9	Ensure the Ethernet cable (CAT7) and a known-good Thunderbolt to Ethernet adapter are properly connected to the iMac. Do you have the correct cable and adapter?	Yes	Go to step 10.
		No	Create a GSX Escalation, then contact ACS.
10	Check the USB connections on the back of the iMac. Are there any other fixtures plugged into the iMac?	Yes	Unplug all other fixtures connected to the iMac. Go to step 11.
		No	Go to step 11.
11	Check the connection of the Thunderbolt to Ethernet adapter to the iMac. Is the adapter plugged into a Thunderbolt port?	Yes	Go to Step 12.
		No	Ensure the iMac has a working Thunderbolt port. Do not use a Mini DisplayPort or USB to Ethernet adapter. • If so, plug in fixture and go to step 12. • If not, see fixture iMac requirements in Quick Checks.

12	Quit the 3D TouchCal software. Insert Troubleshooting Unit inside fixture. Check the USB connection to the iMac after closing fixture door by going to About This Mac > System Report > Hardware > USB. Is “iPhone” listed as a connected device in the fixture listed under USB in System Information? 	Yes	Launch the 3D TouchCal software. Go to step 13.
		No	Double check the USB connection between the fixture and the iMac. If issue persists, create a GSX Escalation then contact ACS.
13	Go to System Preferences > Network. Is the Fixture Network listed? 	Yes	Go to step 14.
		No	Restart iMac. If Fixture Network still does not show, re-install 3D Calibration Software Package on iMac. Refer to article OP1788: 3D Touch Calibration Repair Station. If issue persists, create a GSX Escalation then contact ACS.
14	Go to System Preferences > Network. Check that the Fixture Network interface is active. Is there a green status indicator next to Fixture Network?	Yes	Go to step 15.
		No	Verify fixture is turned on. If issue persists, create a GSX Escalation then contact ACS.
15	Go to System Preferences > Network. Check that only the Fixture Network is set up. Is there an additional Thunderbolt to Ethernet network interface listed with a green status indicator?	Yes	Unplug the Thunderbolt to Ethernet adapter and reinstall 3D Calibration Software Package on iMac. Then plug in Thunderbolt to Ethernet adapter and restart iMac. If issue persists, create a GSX Escalation then contact ACS.
		No	Go to step 16.
16	The 3D TouchCal software requires an active Internet connection. Open Safari and navigate to apple.com. Are you able to open apple.com?	Yes	Attempt calibration with Troubleshooting Unit. Go to step 17.
		No	Contact System Administrator to troubleshoot the Internet connection.

17	Did the attempt at calibration of the Troubleshooting Unit pass?	Yes	The 3D TouchCal fixture is working normally.
		No	Go to step 18.
18	Contact ACS to check Calibration Network System Status and next steps.		Contact ACS to check Calibration Network System Status and next steps.

Internal View, Parts List, Screw Diagram

Internal View of iPhone 7 Plus



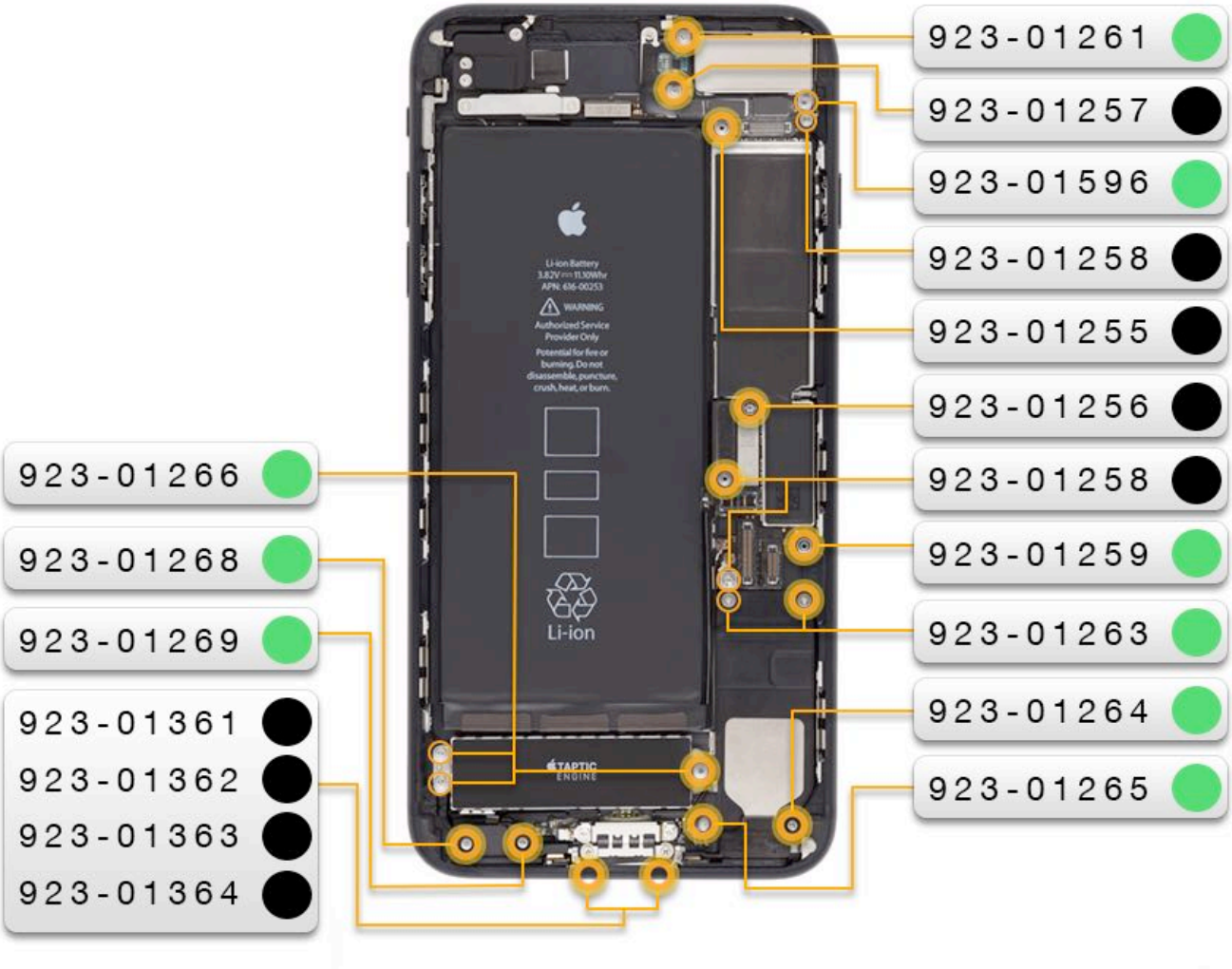
1. Battery
2. Battery adhesive tabs
3. Taptic Engine
4. Bottom microphones
5. Lightning connector
6. iSight camera
7. FaceTime camera/receiver/ALS connector
8. Logic board
9. SIM reader
10. Battery connector
11. Display/Multi-Touch connector
12. Home button/Touch ID sensor connector
13. Speaker
14. Receiver
15. FaceTime camera/receiver/ALS flex
16. Display/Multi-Touch flex
17. Home button/Touch ID sensor flex
18. Home button/Touch ID sensor assembly

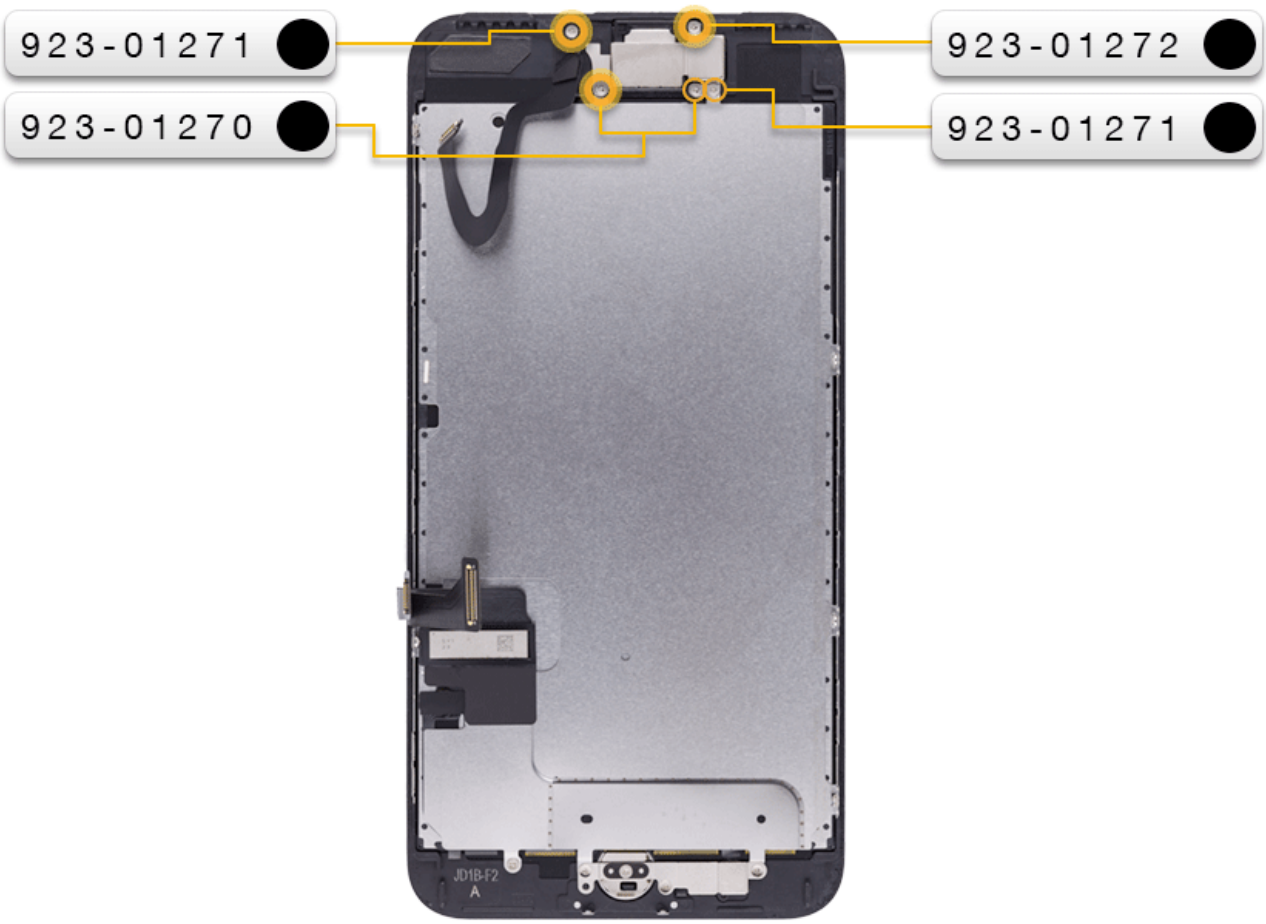
Parts List

Description	Part Number	Kit Contents (order screws separately)	Screws
Battery/Display Cowling	**923-01251**	10 cowlings	**923-01256** top **923-01258** center and lower left **923-01259** right
Battery Kit	**661-05755**	1 battery 1 battery adhesive pack	
Camera	**661-05754**		
Camera Cowling	**923-01805**	10 cowlings	**923-01261** upper left **923-01596** lower right (superscrew)
Camera Flex Cowling	**923-01252**	10 cowlings	**923-01257** upper left **923-01255** center **923-01258** lower right
Display Adhesive	**923-01366** black **923-01367** white	30 display adhesive sheets	
Receiver			
Receiver Cowling	**923-01254**	10 cowlings	**923-01271** upper left and lower right **923-01272** upper right **923-01270** lower left and center
Security Screws		200 screws	**923-01361** black/Jet black **923-01362** silver **923-01363** gold **923-01364** rose gold
SIM Tray	**923-01245** black **923-01246** silver **923-01247** gold **923-01248** rose gold **923-01249** Jet black		
Speaker	**923-01242**		**923-01263** upper left and right **923-01264** lower right **923-01265** lower left
Taptic Engine			**923-01266** (3)
Taptic Engine Flex Cowling			**923-01268** left **923-01269** right

Screw Diagram

Use the iPhone torque driver (black) for screws marked with a black dot.
Use the iPhone torque driver (green) for screws marked with a green dot.


923-01261
923-01257
923-01596
923-01258
923-01255
923-01256
923-01258
923-01259
923-01263
923-01264
923-01265
923-01266
923-01268
923-01269
923-01361
923-01362
923-01363
923-01364
Li-ion Battery
3.82V 11.10Wh
APN: 616-00253
WARNING
Authorized Service Provider Only
Potential for fire or burning. Do not disassemble, puncture, crush, heat, or burn.
Li-ion
TAPTIC ENGINE


923-01271
923-01270
923-01272
923-01271
JD1B-F2
A

iPhone 7 Plus Repair Video List

The iPhone 7 Plus features a new internal design. In these videos, learn about these changes and how to properly replace internal components in the course of a repair.

- iPhone 7 Plus Open Device Video
- iPhone 7 Plus Taptic Engine Replacement Video
- iPhone 7 Plus Camera Replacement Video
- iPhone 7 Plus Battery Replacement Video
- iPhone 7 Plus Speaker Replacement Video

For issues with video content or playback, email the **AppleCare Media Production** team at **servicevideos@group.apple.com.**
Note: You may not receive a response, but all comments will be reviewed and investigated as needed.

SIM Tray

First Steps

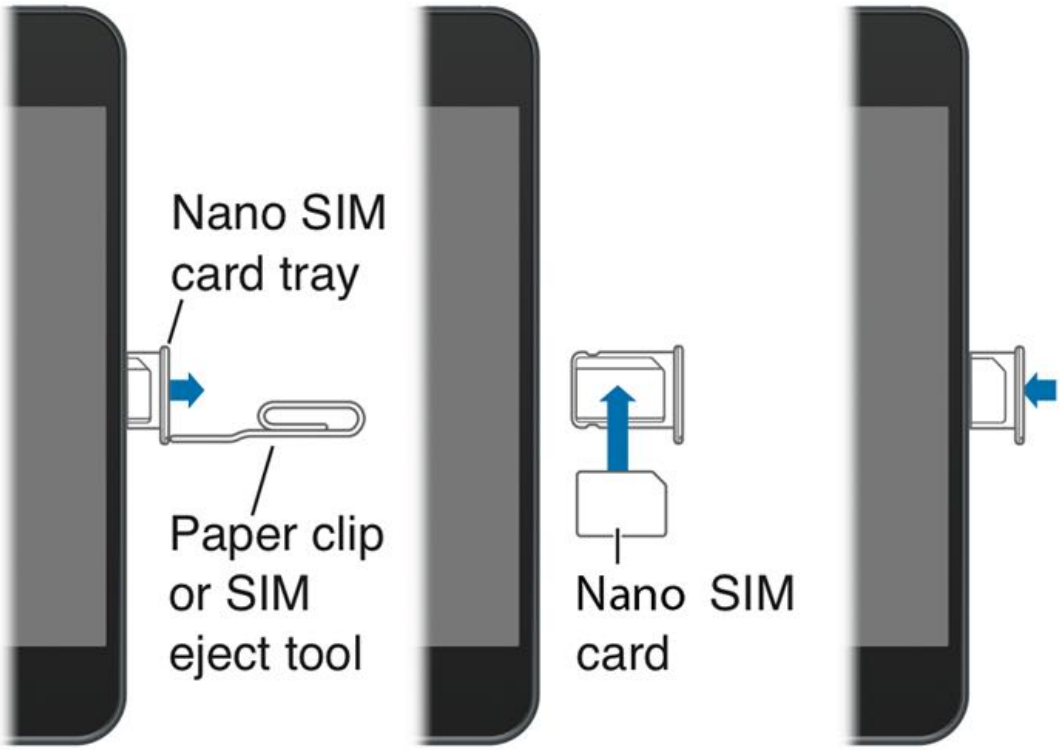
- Turn off the iPhone.

Tools

- SIM removal tool (922-8417) or paper clip (size #1)

Steps For Removal

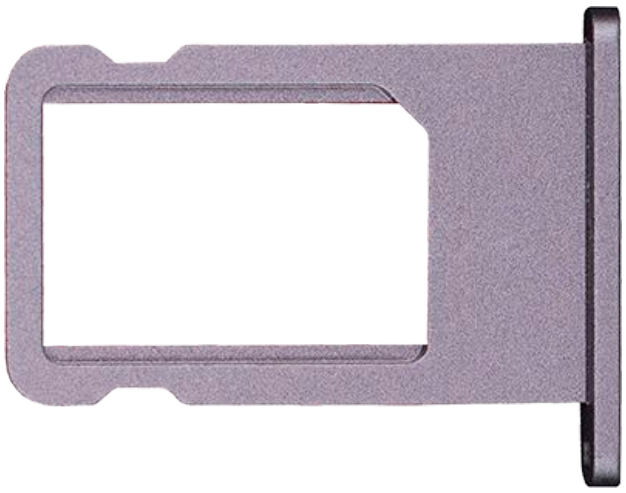
1. Insert the end of a SIM removal tool (922-8417) or a small, thin paper clip (size #1) into the hole on the SIM tray.
2. Push the tool straight in firmly until the tray pops out.



Steps For Reassembly

Note the orientation of the tray and SIM card before inserting it into the iPhone.

Caution: Do not force the SIM tray into position, as it could cause internal damage to the iPhone.



Open Device

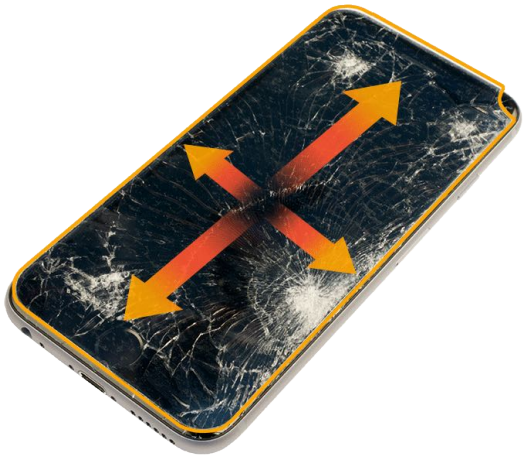
First Steps

- Refer to the Visual/Mechanical Inspection (VMI) Guide to determine whether any accidental damage is present.
- Remove any cases or screen protectors.
- Follow electrostatic discharge (ESD) precautions.
- Turn off the iPhone.

Warning: If the enclosure is separated due to a swollen battery, **stop the repair**. Do not remove the battery from the device. Replace the whole unit. Refer to articles TP328: iPhone Safety and HT204762: Enclosure separation due to expanded battery.

Warning: If the display glass is broken, put on safety glasses and material handling gloves. Use a vacuum cleaner to remove any shards present on the workspace or the display. Affix a protective display cover or packing tape before removal to prevent injury or scattering of glass. Do not install the display cover or tape over the edge of the display.

When installing a 5.5-inch Display Protective Cover (923-01093), firmly press the cover onto the broken display to remove air bubbles and work the adhesive into the cracks in the glass. The cover should be left to settle into place longer for more damaged displays, up to 12 minutes, before attempting to remove the display. The longer the protective cover is left on the display, the stronger the bond between the cover and the broken glass.



For video instruction, refer to article SV317: iPhone 7 Plus Open Device Video.

Tools

1. iPhone torque driver (black) (923-0248)
2. iPhone torque driver (green) (923-00105)
3. Security bit (923-0247)
4. MicroStix bit (923-01290)
5. JCIS bit (923-0246) for cross-head screws
6. Black stick (922-5065)
7. Universal Display Removal Fixture (923-01385)
8. iPhone 6s and 6s Plus Display Removal Fixture Adapter (923-00652)
9. 5.5-inch Repair Tray (923-01292)
10. Display Adhesive Cutter (923-01092)
11. Display Press (661-06743)
12. Display Press Pad (923-01598, not shown)

Steps For Removal

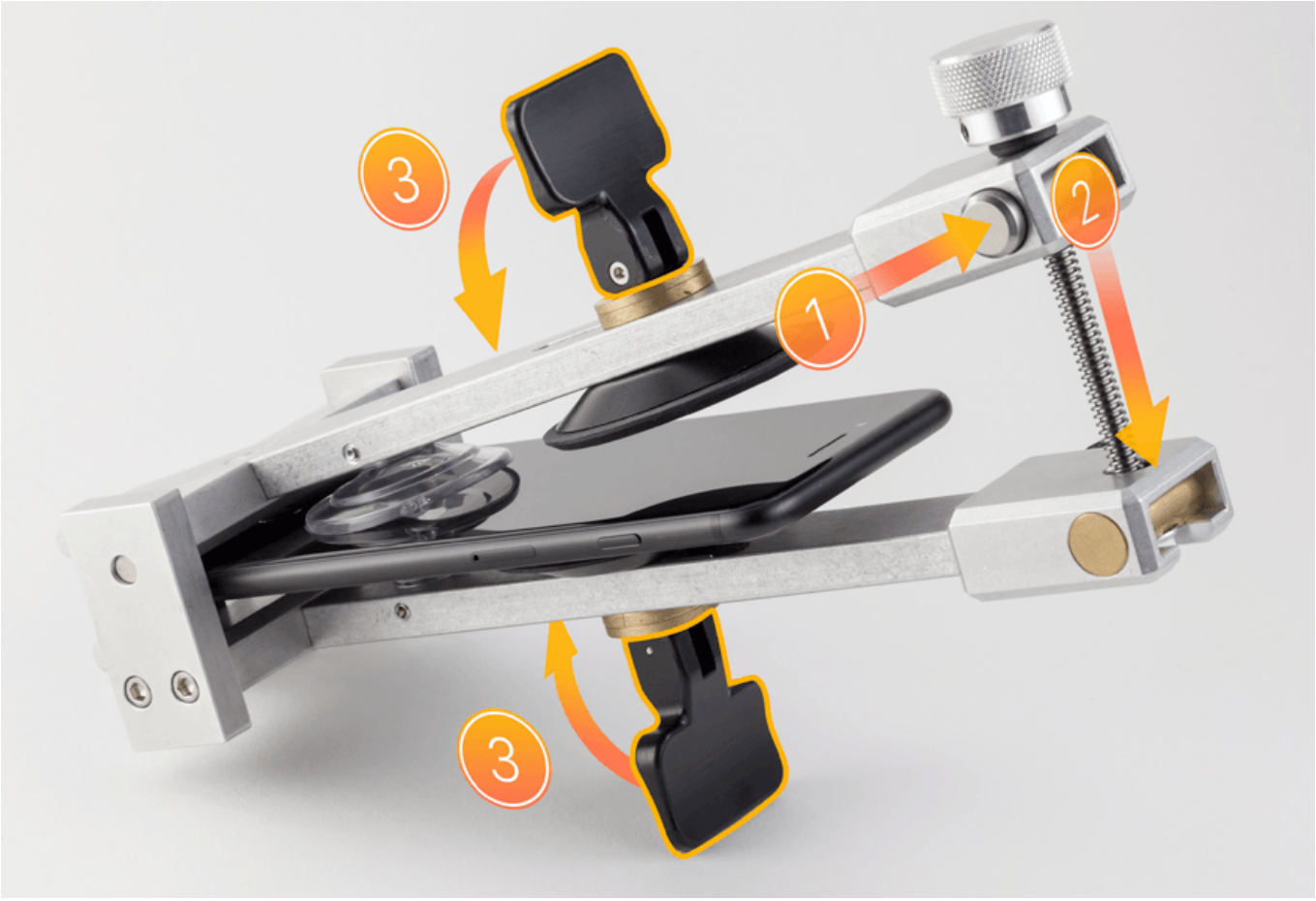
1. Use the iPhone torque driver (black) and security bit to remove and discard two security screws, one from each side of the Lightning connector.

2. Secure the iPhone 6s and 6s Plus Display Removal Fixture Adapter to the Universal Display Removal Fixture. Be sure that the handles of the fixture are fully inserted into the adapter and the thumb screws are tight.

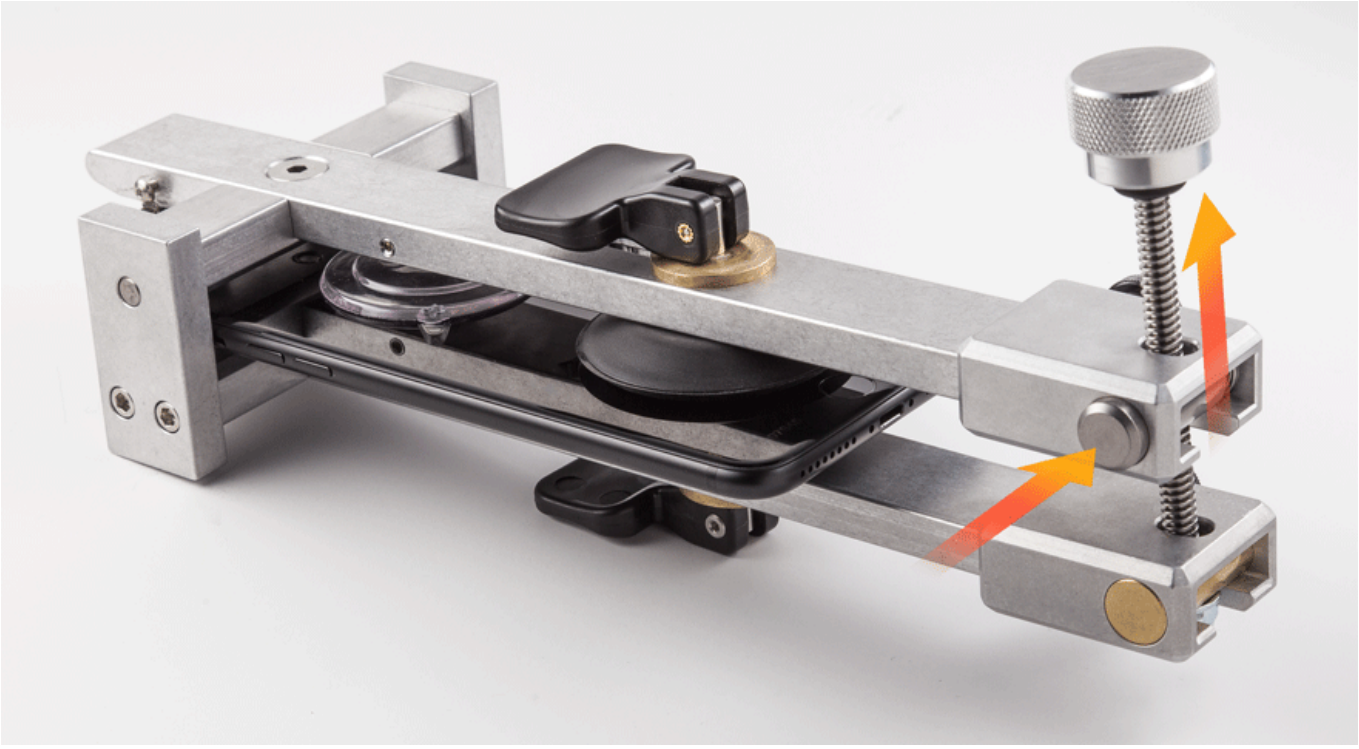
3. Adjust the suction cup to the farthest point from the pivot and as close to the Home button as possible without touching it. Adjust the suction cup on the back of the device to align with the position of the one on the display. Press the iPhone down to secure the lower suction cups.

Caution: Be sure to use an updated Universal Display Removal Fixture and Display Removal Fixture Adapter with iPhone 7 Plus. Other fixtures may cause damage.

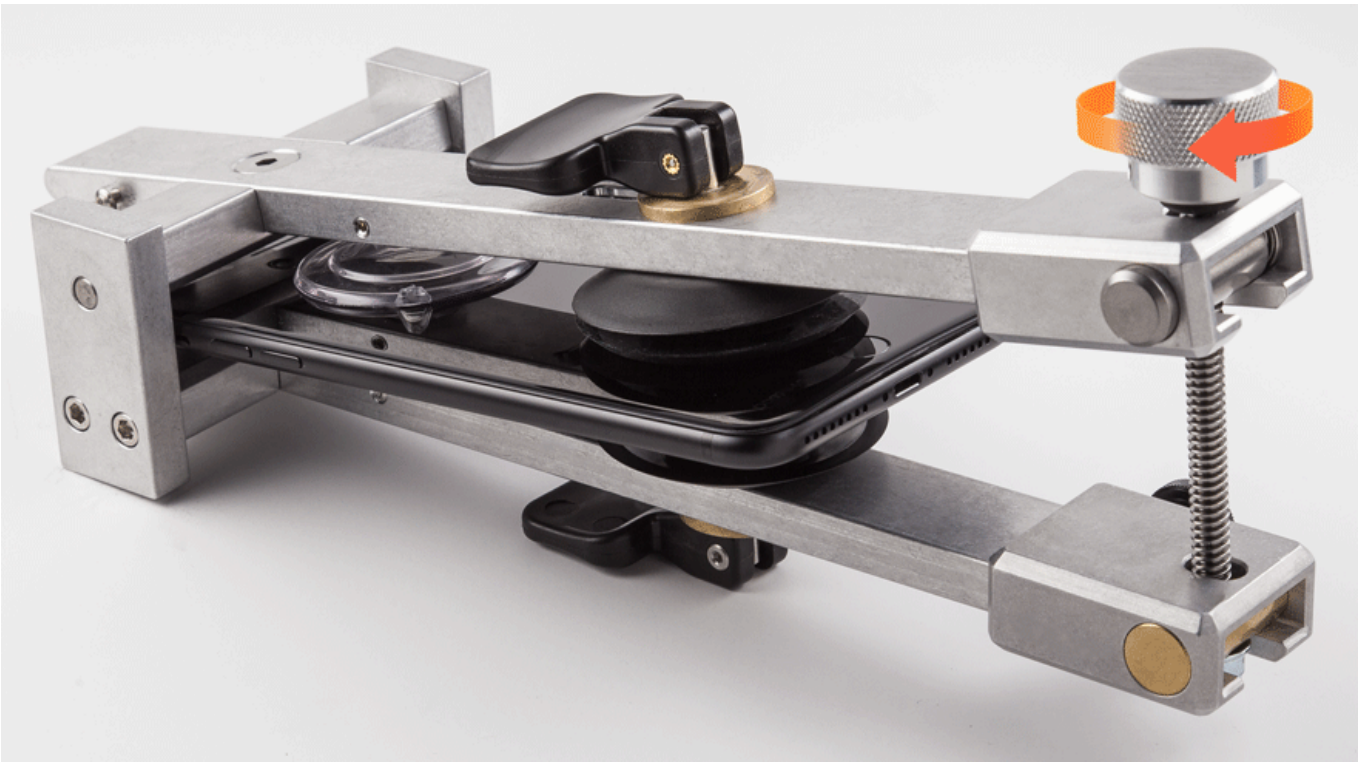
4. Press and hold the release button on the adapter, then press the lever down to secure the upper suction cups to the display glass.



5. Press and hold the release button on the adapter, then slowly separate the metal bars until resistance is felt. Do not use excessive force.

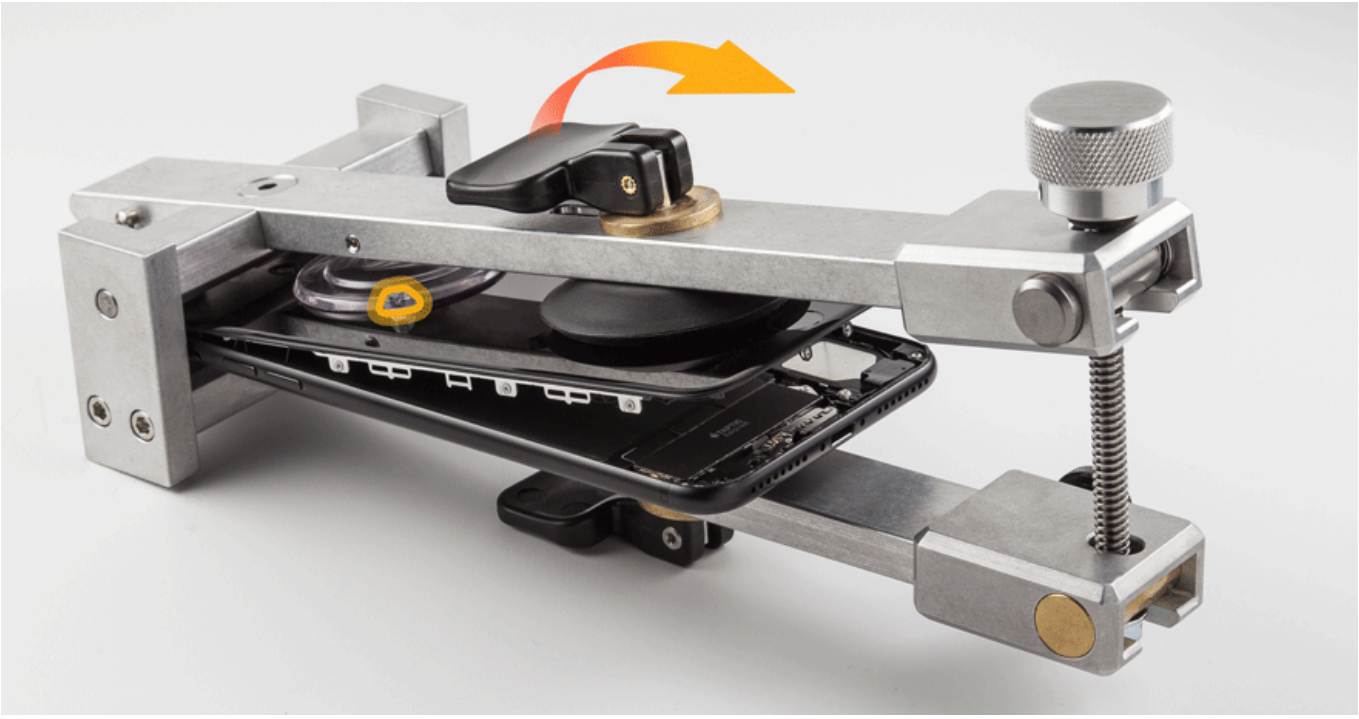


6. Slowly turn the knob on the adapter until the display begins to separate from the enclosure.



7. Insert the Display Adhesive Cutter between the display and the enclosure until the edge of the cutter is inside the enclosure. Run the cutter between the display and the enclosure until the display is free.

8. Loosen the four suction cups to release the display and the enclosure from the fixture. **Note:** The bottom suction cup may reattach when attempting to remove the iPhone.



9. Insert the Display Adhesive Cutter between the display and the enclosure near the top of the display. Run the cutter between the display and the enclosure until the display is free.

10. Tilt the bottom of the display up and slide the display toward the bottom of the device to release the clips. **Important:** To avoid damaging the display flexes, do not tilt the display more than 15 degrees.

11. Carefully tilt the display to the right.

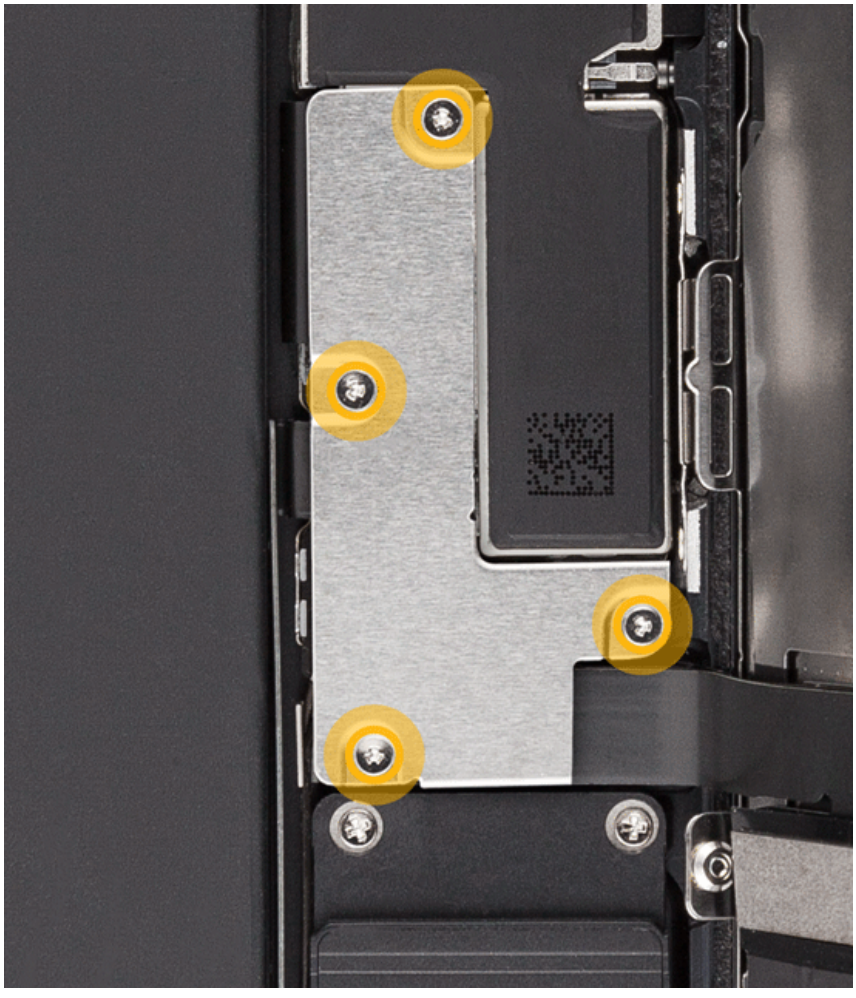
Caution: Be sure that display clips are released before tilting display to avoid damage to the enclosure or display. Do not damage the display flexes while lifting the display.

Warning: If the battery is dented, punctured, swollen, or otherwise damaged, then **stop the repair**. Do not remove the battery from the device. Reassemble and replace the whole unit.
Refer to articles TP328: iPhone Safety and HT204762: Enclosure separation due to expanded battery.

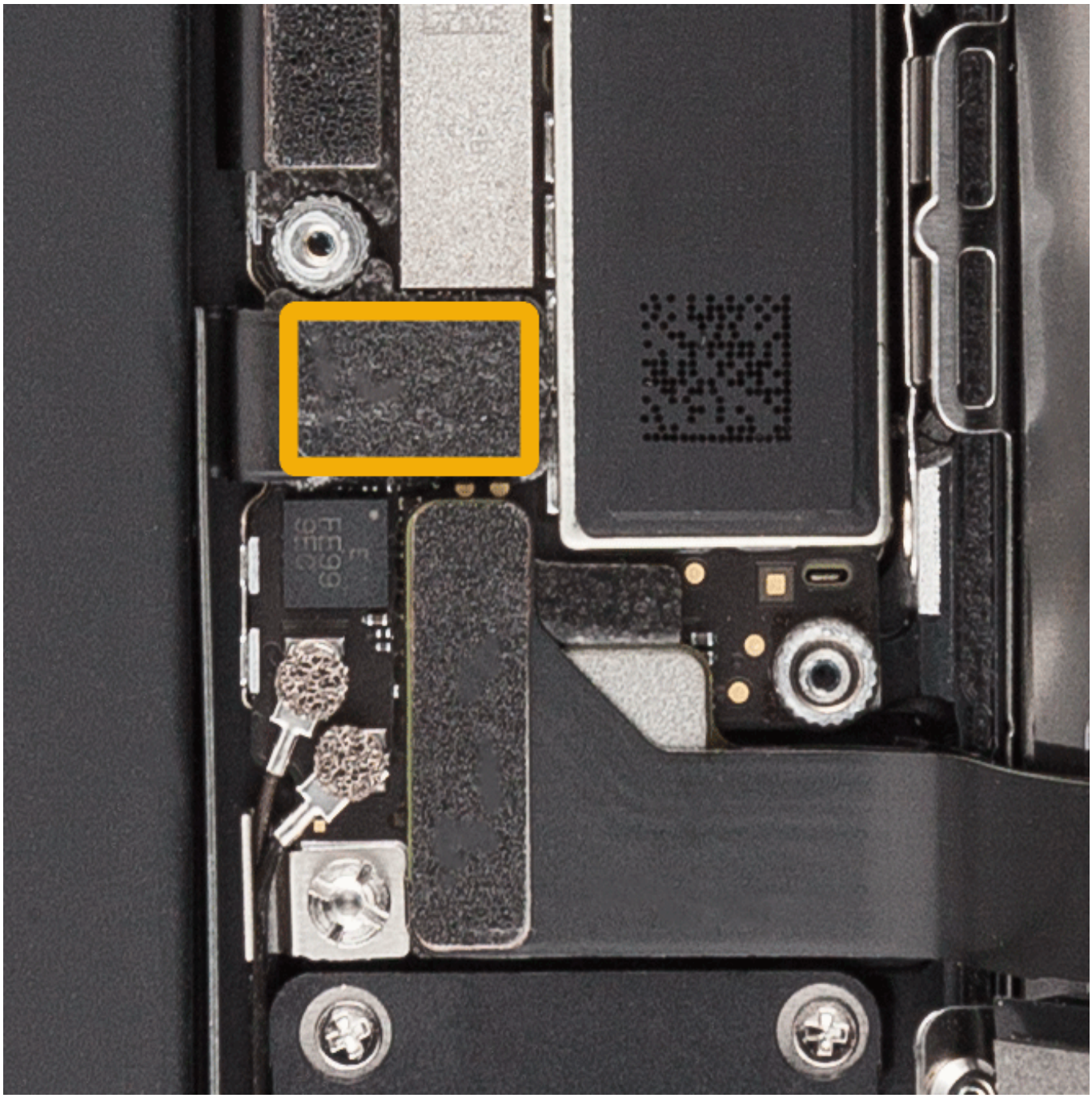
12. Insert the iPhone into the repair tray. Gently press along the edges of the display to secure the display to the suction cup.
Important: Do not press the back of the display to secure the display to the suction cup. Pressing the back of the display may affect 3D Touch functionality.

13. Use the iPhone torque driver (black) and MicroStix bit to remove and discard four trilobe screws from the battery/display cowling.

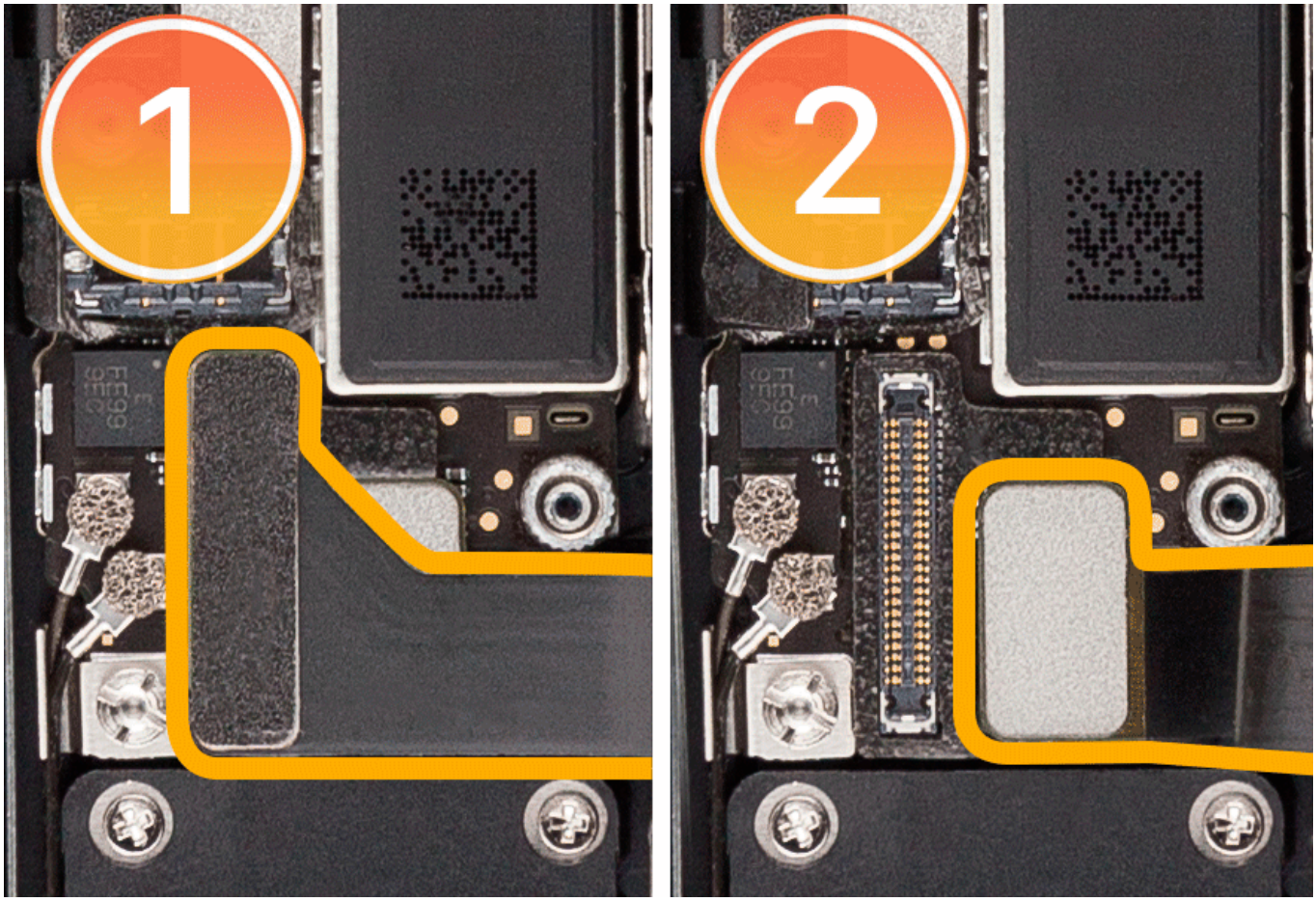
14. Remove the battery/display cowling. Save it for reuse.



15. Use a black stick to disconnect the battery connector from the logic board.

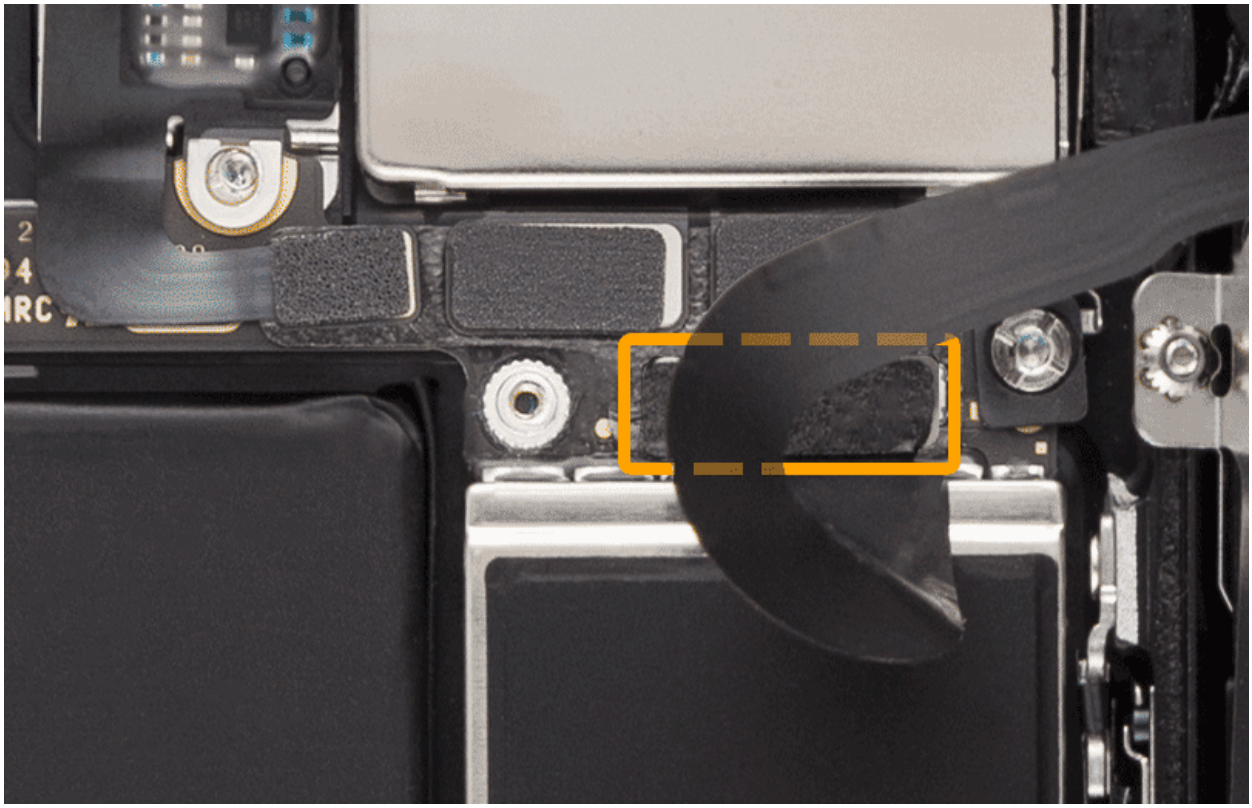


16. Use a black stick to disconnect two stacked display flex connectors in the order shown below. Gently lift each connector to reveal the flex connectors below.



17. Use the iPhone torque driver (black) and MicroStix bit to remove and discard three trilobe screws from the camera flex cowling. Save the cowling for reuse.

18. Use a black stick to disconnect the flex connector.



19. Remove the display assembly from the enclosure.

20. Use a black stick to remove adhesive residue from the display and the enclosure. **Important:** Clean the enclosure and the display thoroughly to ensure a proper seal during reassembly. To review video instruction for the recommended adhesive removal method, refer to article SV317: iPhone 7 Plus Open Device Video.

Steps For Reassembly

Important: Make sure that all adhesive is removed from the display and enclosure before applying new adhesive.

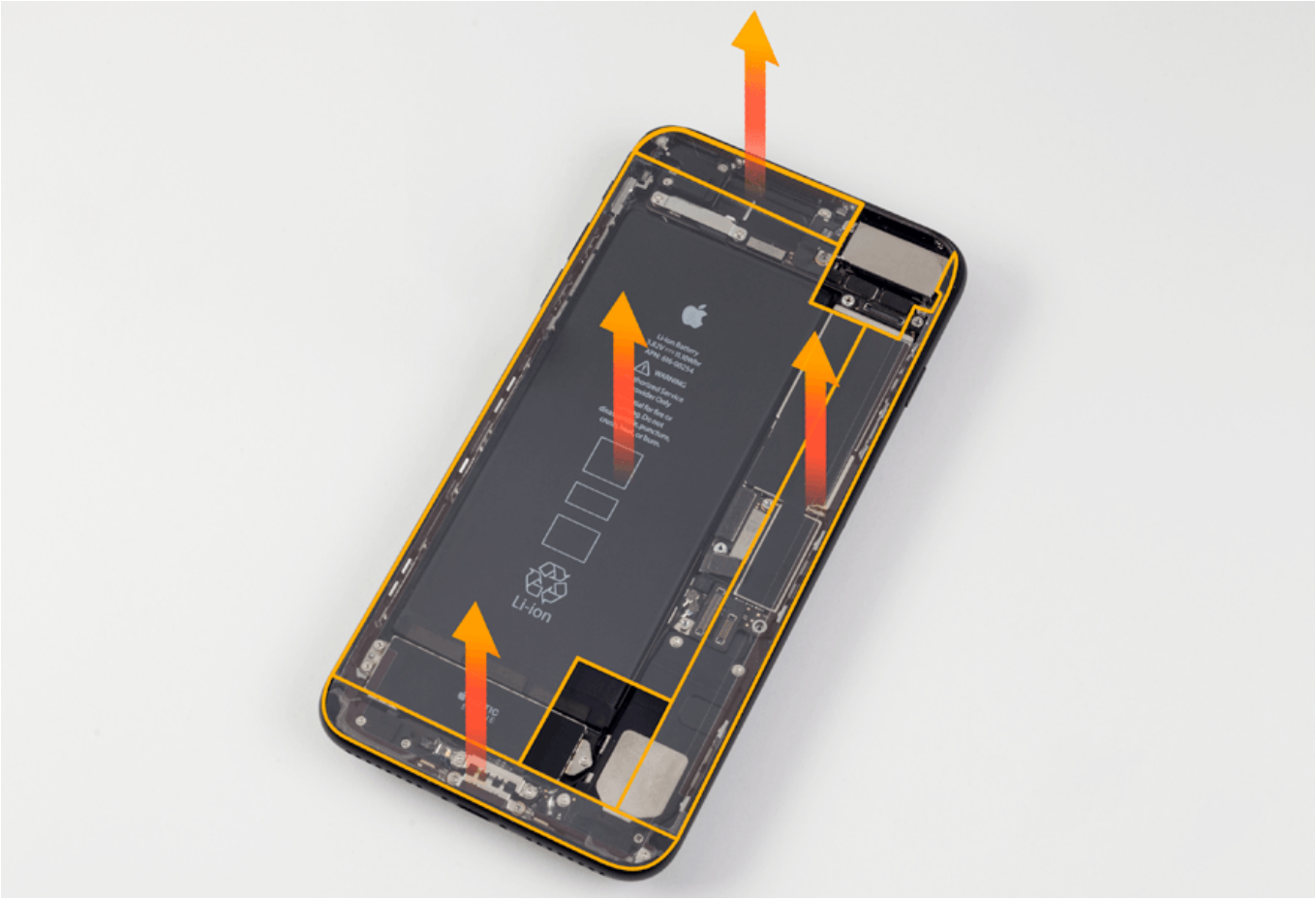
1. Align the display adhesive with the enclosure. **Important:** The flexible release liner must face the enclosure.

- 923-01366 (Black adhesive for black and Jet black)
- 923-01367 (White adhesive for gold, rose gold, and silver)

2. Slowly remove the flexible release liner while pressing the adhesive into the enclosure. **Important:** Do not remove the top release liners.

3. Use a black stick to adhere the display adhesive to the enclosure.

4. Remove the center section of the top release liner first, followed by the three sections running along the top, right, and bottom edges.

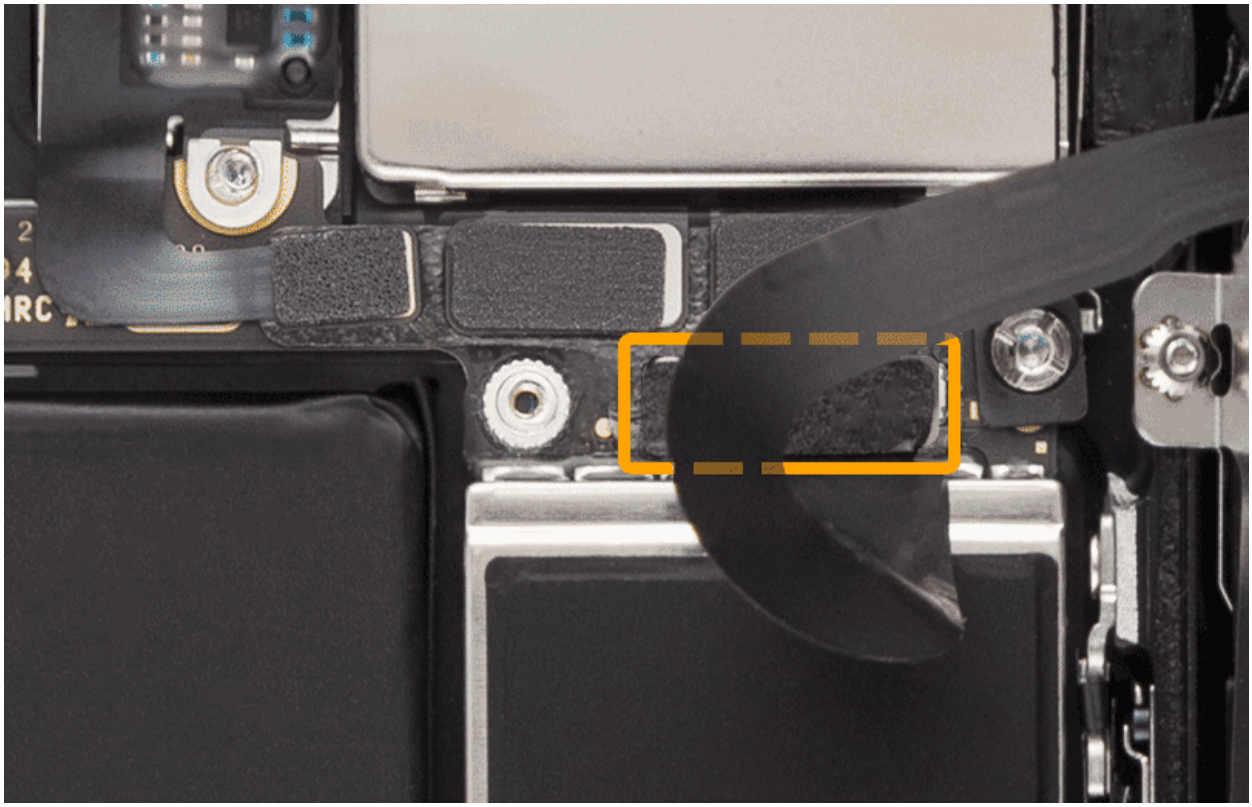


5. Place the enclosure in the repair tray.

6. Insert the iPhone into the repair tray. Gently press along the edges of the display to secure the display to the suction cup.
Important: Do not press the back of the display to secure the display to the suction cup. Pressing the back of the display may affect 3D Touch functionality.

Important: Do not remove the remaining release liners.

7. Reconnect display flex connector. Press down gently, applying even pressure along the entire length of each connector to ensure proper seating.



8. Place the camera flex cowling (923-01252) over the flex connector.

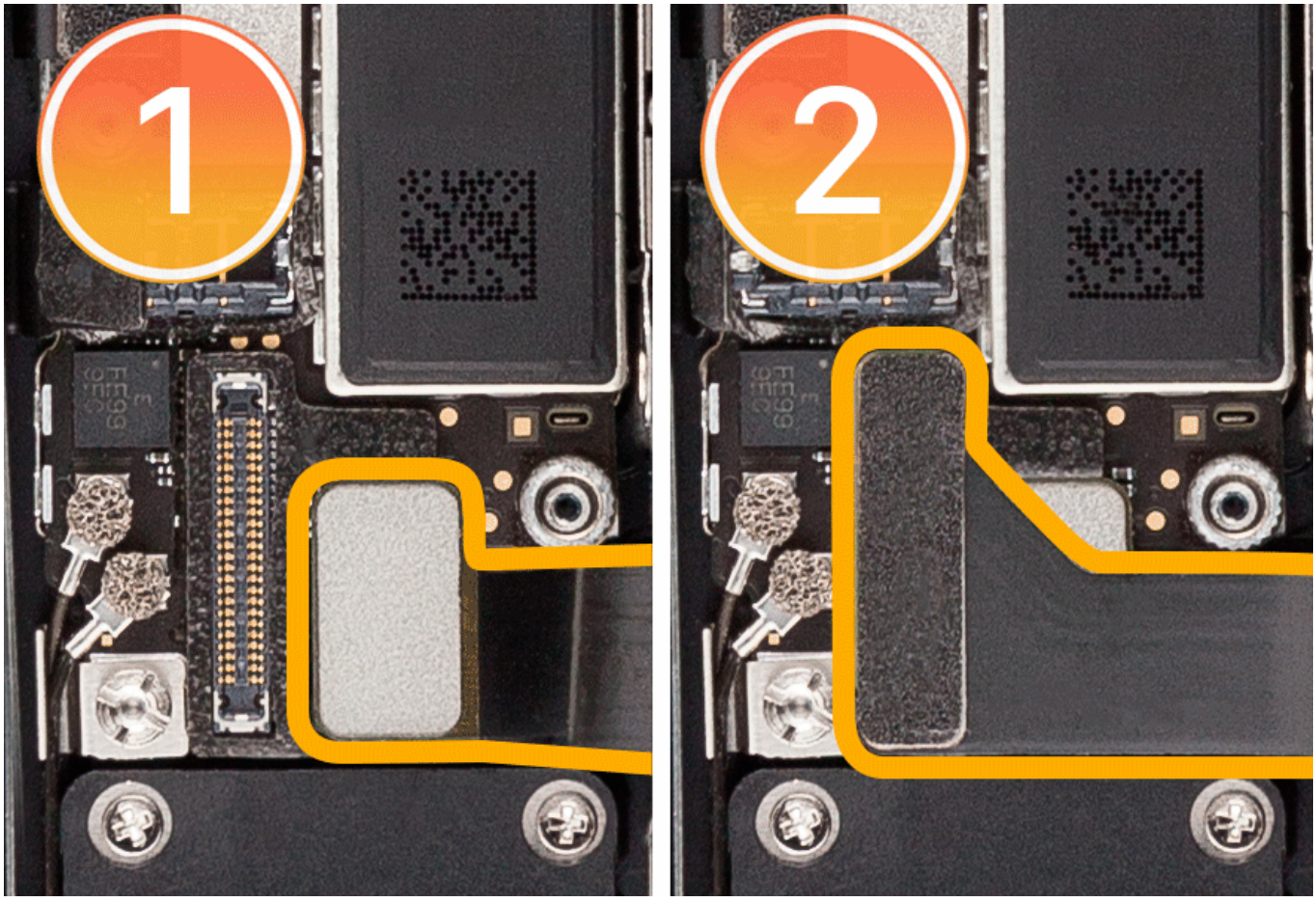
9. Use the iPhone torque driver (black) and MicroStix bit to install three **new** trilobe screws into the camera flex cowling.

- 923-01257, upper left
- 923-01255, center
- 923-01258, lower right

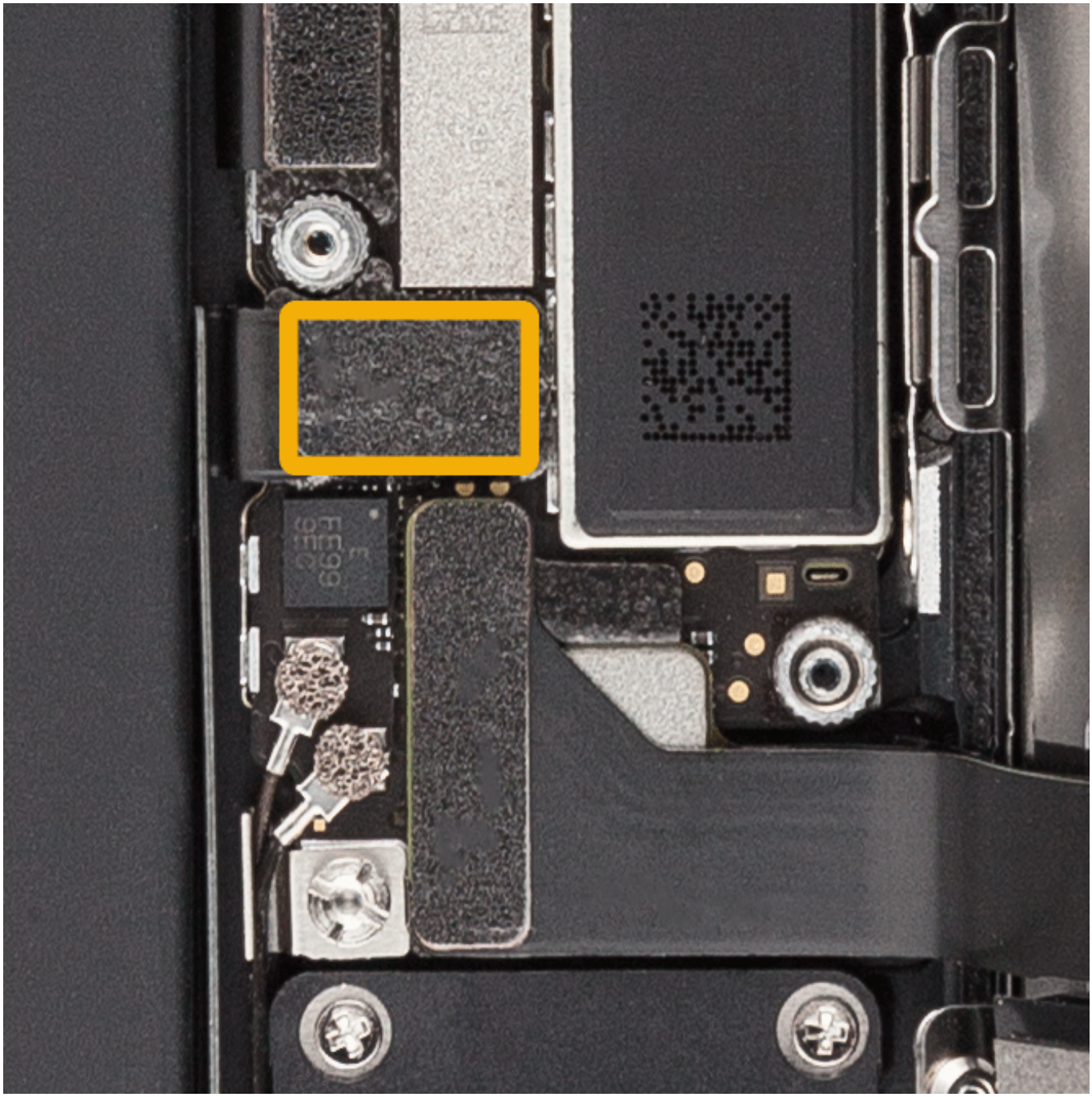
Important: Do not reuse old screws. If a camera flex cowling is not present, then install one upon reassembly.

10. Align the right edge of the display assembly with the right edge of the enclosure.

11. Reconnect two display flex connectors in the order shown. Press down gently, applying even pressure along the entire length of each connector to ensure proper seating.



12. Connect the battery connector to the logic board.



13. Position the battery/display cowling (923-01251) over the stacked connectors.

Important: If a battery/display cowling is not present, then install one upon reassembly.

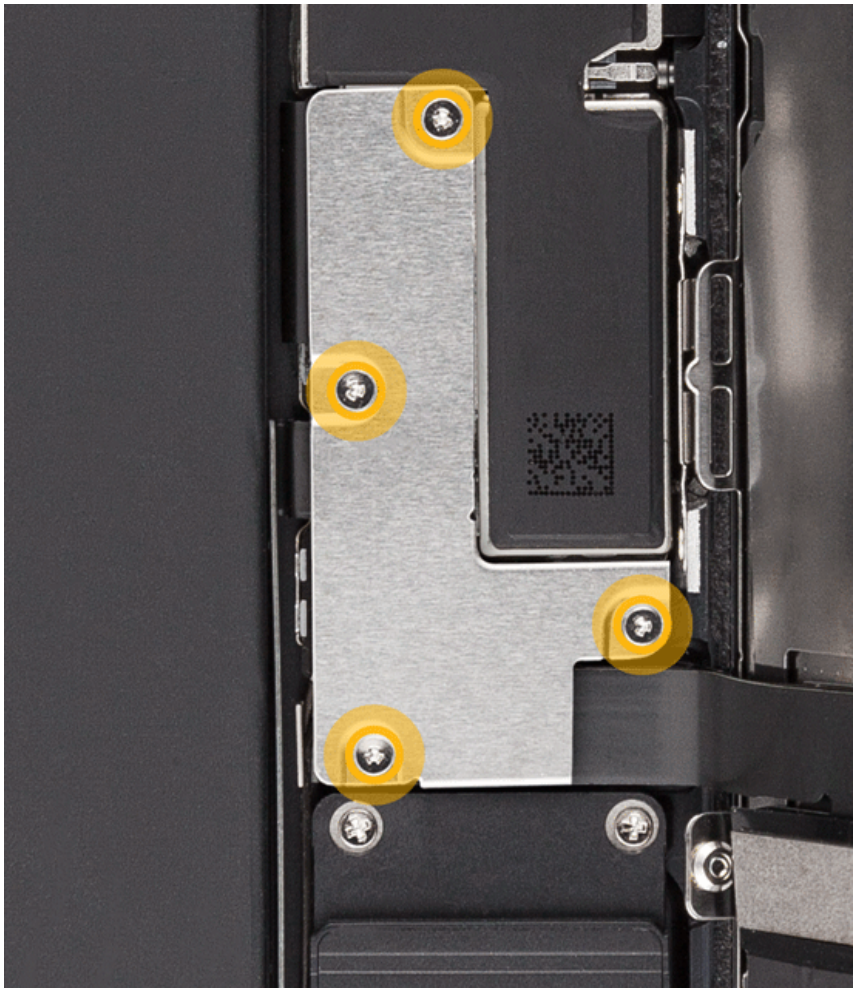
14. Use the iPhone torque driver (black) and MicroStix bit to install three **new** trilobe screws into the battery/display cowling.

- 923-01256, top
- 923-01258, center and lower left

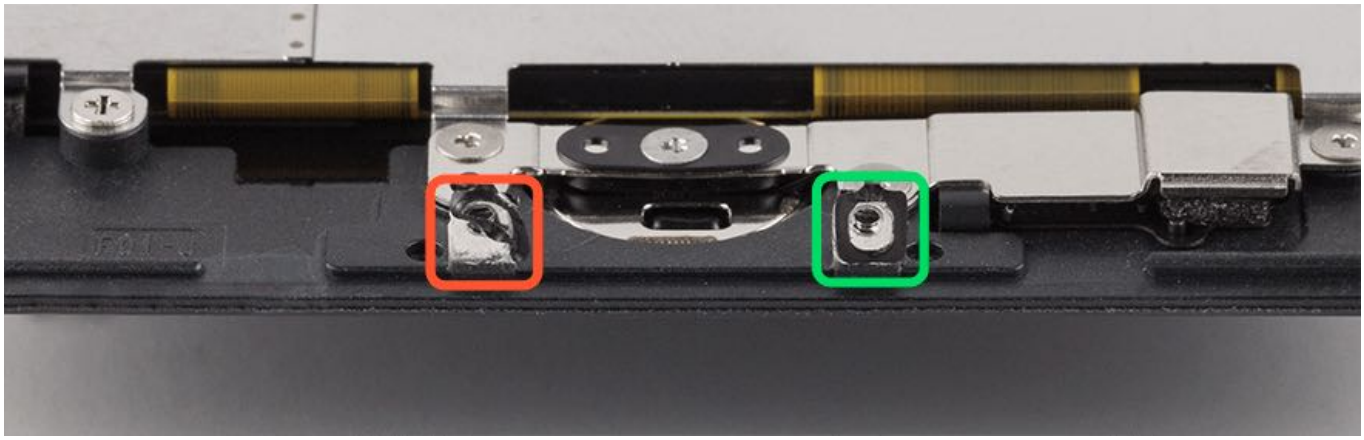
Use the iPhone torque driver (green) and MicroStix bit to install one **new** trilobe screw into the battery/display cowling.

- 923-01259, right

Important: Do not reuse old screws.



15. Some display assemblies may have screw boss gaskets. If the gaskets are present, then inspect display screw bosses to verify gaskets are in place correctly. Both gaskets should look like the one marked in green. If a gasket is damaged (see example marked in red), then remove both gaskets. If the gaskets are not present or damage, then proceed with the repair.



16. Gently loosen the display from the suction cup by pulling the suction cup tab.

Warning: If the battery is dented, punctured, swollen, or otherwise damaged, then **stop the repair**. Do not remove the battery from the device. Reassemble and replace the whole unit.
Refer to articles TP328: iPhone Safety and HT204762: Enclosure separation due to expanded battery.

17. Remove the iPhone from the tray.

18. Place the iPhone on a flat, level surface and gently remove the remaining top release liner. Peel the release liner in a counterclockwise direction starting near the iSight camera.

19. Align the right edge of the display with the right edge of the enclosure. Tilt the display down into the enclosure.

20. Tilt the bottom of the display up and slide the display toward the top of the device to clip the top of the display into the enclosure.

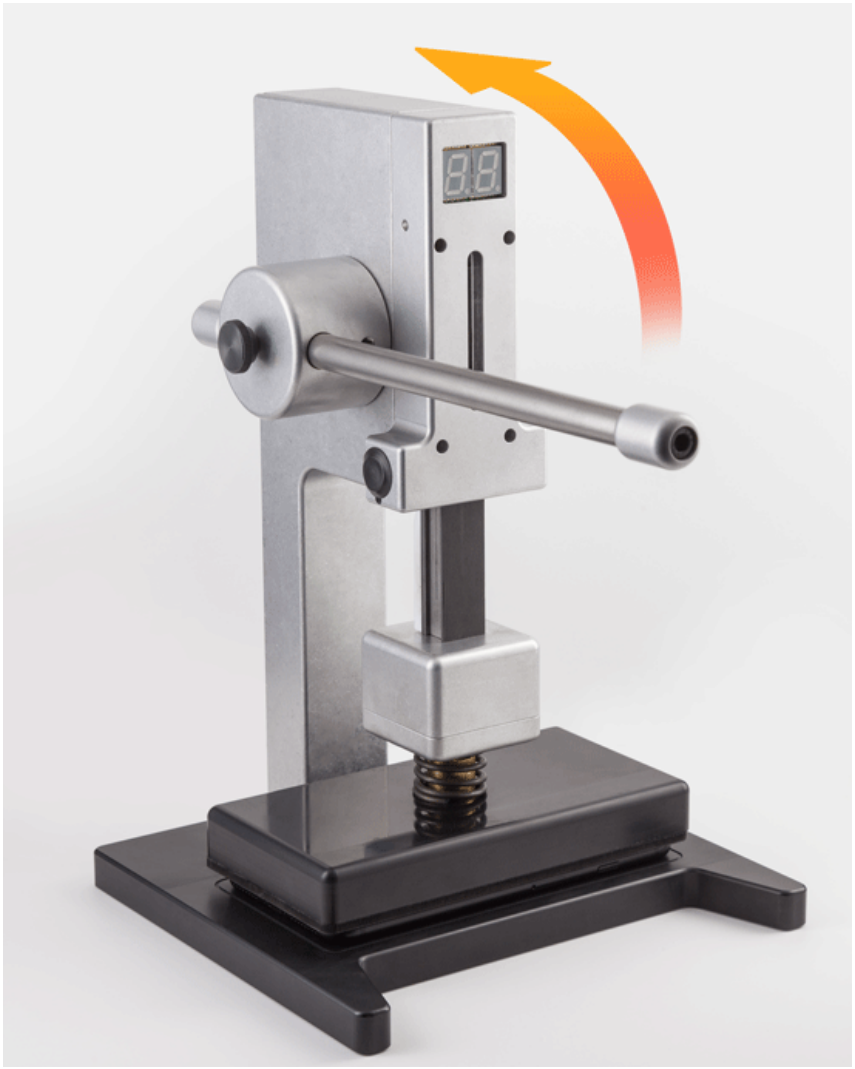
Important: To avoid damaging the display flexes, do not tilt the display more than 15 degrees.

21. Press along the edges of the display until an audible click is heard and the display is flush with the enclosure. **Important:** Ensure the display flexes are not trapped between the display and enclosure.

22. Place the Display Press Pad on top of the iPhone.

23. Place the iPhone in the Display Press and pull the lever down until the press locks. **Important:** Use the Display Press to ensure a proper seal and 3D Touch functionality. Display calibration may fail if this step is not completed.

24. Wait until the press timer beeps, then lift the lever and remove the iPhone from the press. **Important:** Use the Display Press to ensure a proper seal and 3D Touch functionality. Display calibration may fail if this step is not completed.



25. Press firmly each location shown below.

26. Use the iPhone torque driver (black) and security bit to install two **new** security screws, one on each side of the Lightning connector.

- 923-01361 (for black and Jet black)
- 923-01362 (for silver)
- 923-01363 (for gold)
- 923-01364 (for rose gold)

27. Turn iPhone on.

28. Turn off Auto-Brightness in Settings > Display & Brightness.

29. Set brightness to maximum.

30. Open Compass app.

31. Switch to the level function.

32. Check the bottom edge of the display for bright spots.

Known-Good Display	Example of Bright Spots
	

If the display has bright spots, then repeat steps 23 - 25.

If repeating steps 23 - 25 does not resolve the issue, then follow these steps:

- Open device.
- Remove all display adhesive.
- Inspect display screw bosses to verify washers are in place correctly. (Refer to step 15)
- Reassemble with new display adhesive.

If after these steps there are still bright spots, replace the device.

33. **Important:** Check iPhone operation using the steps in article TP1045: Functional Test.

Replace Display Assembly

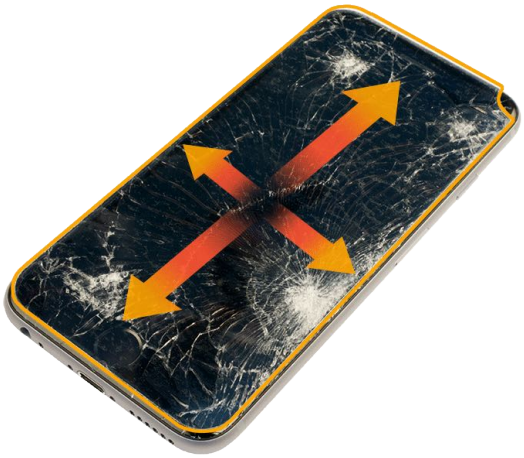
First Steps

- This procedure should only be performed by Apple-certified technicians at authorized locations that have a 3D Touch Calibration Fixture.
- Refer to the Visual/Mechanical Inspection (VMI) Guide to determine whether any accidental damage is present.
- Remove all saved fingerprints in Settings > Touch ID & Passcode.
- Remove any cases or screen protectors.
- Follow electrostatic discharge (ESD) precautions.
- Turn off the iPhone.

Warning: If the enclosure is separated due to a swollen battery, **stop the repair**. Do not remove the battery from the device. Replace the whole unit. Refer to articles TP328: iPhone Safety and HT204762: Enclosure separation due to expanded battery.

Warning: If the display glass is broken, put on safety glasses and material handling gloves. Use a vacuum cleaner to remove any shards present on the workspace or the display. Affix a protective display cover or packing tape before removal to prevent injury or scattering of glass. Do not install the display cover or tape over the edge of the display.

When installing a 5.5-inch Display Protective Cover (923-01093), firmly press the cover onto the broken display to remove air bubbles and work the adhesive into the cracks in the glass. The cover should be left to settle into place longer for more damaged displays, up to 12 minutes, before attempting to remove the display. The longer the protective cover is left on the display, the stronger the bond between the cover and the broken glass.



Important:

- Display calibration software requires a publicly released version of iOS. For iPhones running beta or SDK versions of iOS, perform a DFU restore before attempting display replacement and calibration.
- Check for iPhone bezel damage that would interfere with proper seating of the display assembly. If the damage is present, replace the whole unit.

For video instruction, search GSX for “Display Replacement and 3D Touch Calibration Video.”

Tools

- Bar code scanner

Steps For Removal

1. Open Device.

Steps For Reassembly

1. Use a replacement display and follow the reassembly steps in article RP1333: Open Device.
2. **Important:** Display calibration is required after a display assembly replacement. For detailed instructions, search GSX for “3D Touch Calibration Procedure.”
3. Test the home button after calibration. Make sure the iPhone is in Sleep mode. Hold the iPhone in one hand and place thumb of the same hand on the home button. Do not press the home button. Make sure there is no taptic feedback.
   If there is any feedback, recalibrate the display. If after recalibration there is feedback, replace display.
4. **For Retail:** Scan the static KBB (Known Bad Board) serial number or type “OLDSERIALNUMBER” in English when prompted. **Note:** The serial number field is not case-sensitive.

   For AASPs: Refer to the “Adding Display Parts to GSX” section of article OP1796: Creating a Carry-In Repair for iPhone display repairs.
5. If calibration fails, follow these steps:
   - Follow software prompts
   - Reset the iPhone
   - Attempt display calibration again. **Important:** Use an alternate fixture if available.

   If the calibration fails again, then reseat the cables and attempt calibration again in the last used fixture.
   If reseating does not resolve the issue, replace the whole unit. Note the failure in the repair and process the part as DOA.
   Note for AASPs: To resolve calibration failures, refer to article OP1796: Creating a Carry-In Repair for iPhone display repairs.
6. **Important:** Check iPhone operation with the steps in article TP1045: Functional Test.

3D Touch Calibration Procedure

This procedure should only be performed by Apple-certified technicians at authorized locations that have a 3D Touch Calibration Fixture.

The 3D Touch Calibration Fixture is intended to calibrate the 3D Touch and the proximity sensor for iPhone 6s, 6s Plus, 7, and 7 Plus.

Follow the calibration procedure after an iPhone display replacement.

Important:

- The 3D Touch calibration software requires that iOS 10 or later is installed on the iPhone. If the device is not running iOS 10 or later, then update the software before performing the repair.
- The 3D Touch calibration software requires a publicly released version of iOS. For iPhones running beta or SDK versions of iOS, perform a DFU restore before attempting display replacement and calibration.
- The 3D Touch Calibration Fixture features a door interlock to protect technicians. The interlock will prevent parts from moving so the technician can safely place or pick up the iPhone. Do not bypass or tamper with the door interlock in any way.
- The 3D Touch Calibration Fixture is very sensitive to vibration. Do not do any of the following while calibration is in progress:
  - Place any objects on top of the fixture
  - Move the fixture
  - Touch the fixture
  - Vibrate or shake the bench
  - Play loud music near the fixture
- If the 3D Touch Calibration Fixture has been turned off for an extended period of time, then allow the fixture 15 minutes to warm up before running the calibration.

Refer to article SV345: Display Replacement and 3D Touch Calibration Video for video instruction.

For fixture setup instructions, technical specifications, and electrical and operating requirements, refer to article TP1547: 3D Touch Calibration Fixture Setup.

Required Tools

- 3D Touch Calibration Fixture
- iMac with 3D TouchCal software

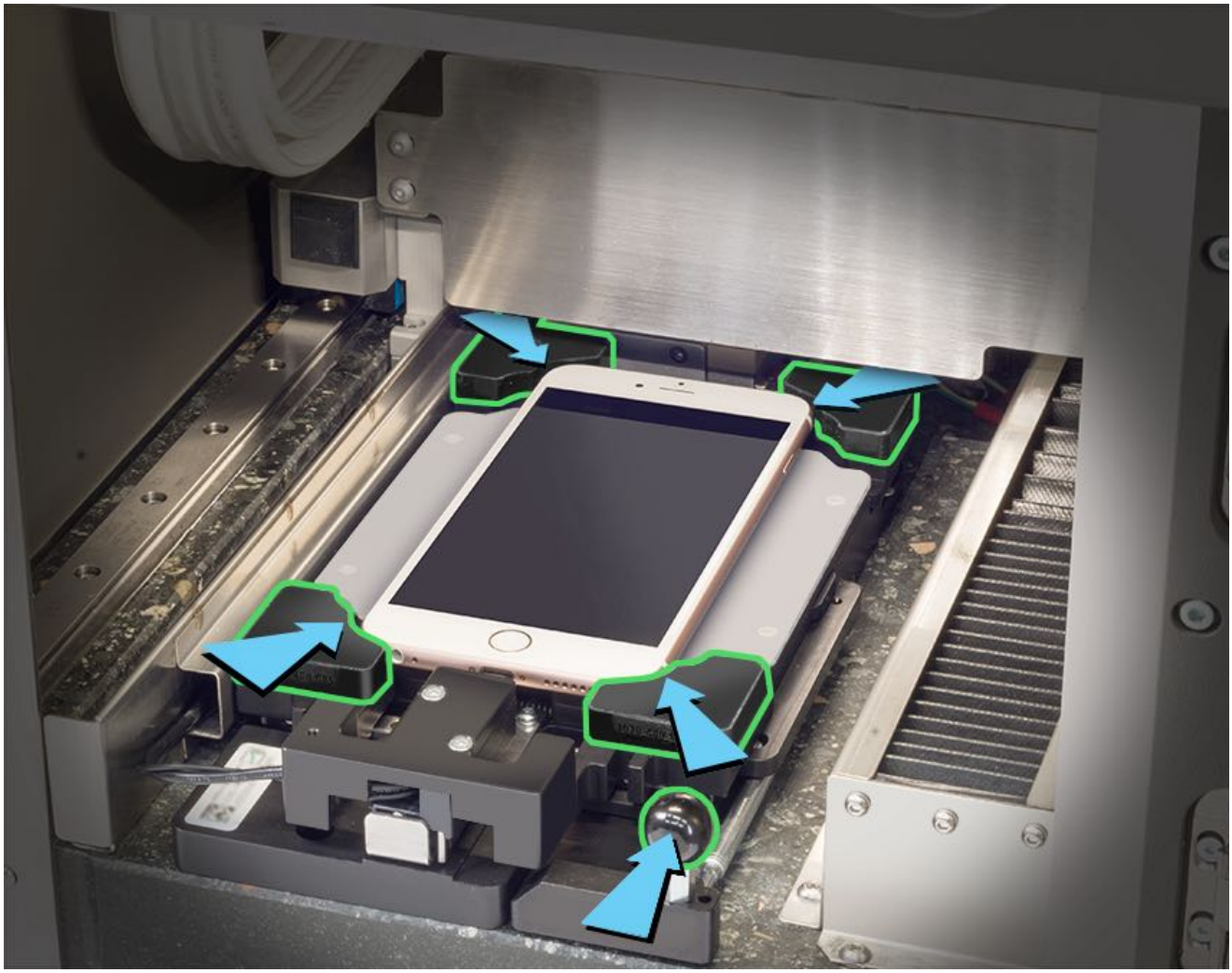
Prepare iPhone for Calibration

- Make sure the iPhone battery has a charge greater than 20% before attempting to calibrate the device.
- The iPhone must turn on and boot to the lock screen or the home screen before placing the device in the calibration fixture.
- If the device does not boot past the Apple logo, then follow these steps in order:
  - Reset the iPhone.
  - Perform an update or restore using iTunes.
  - If the iPhone is in recovery mode and can not be restored, then perform a whole unit replacement.
- If the iPhone does not turn on, then follow these steps in order:
  - Reset the iPhone.
  - Connect iPhone to a known-good USB charger.
  - Open device and reseat battery connector and display connectors.

Important: An iPhone that turns on but has a blank black screen will fail calibration. If a display replacement did not resolve the issue, then follow the troubleshooting steps for the original issue.

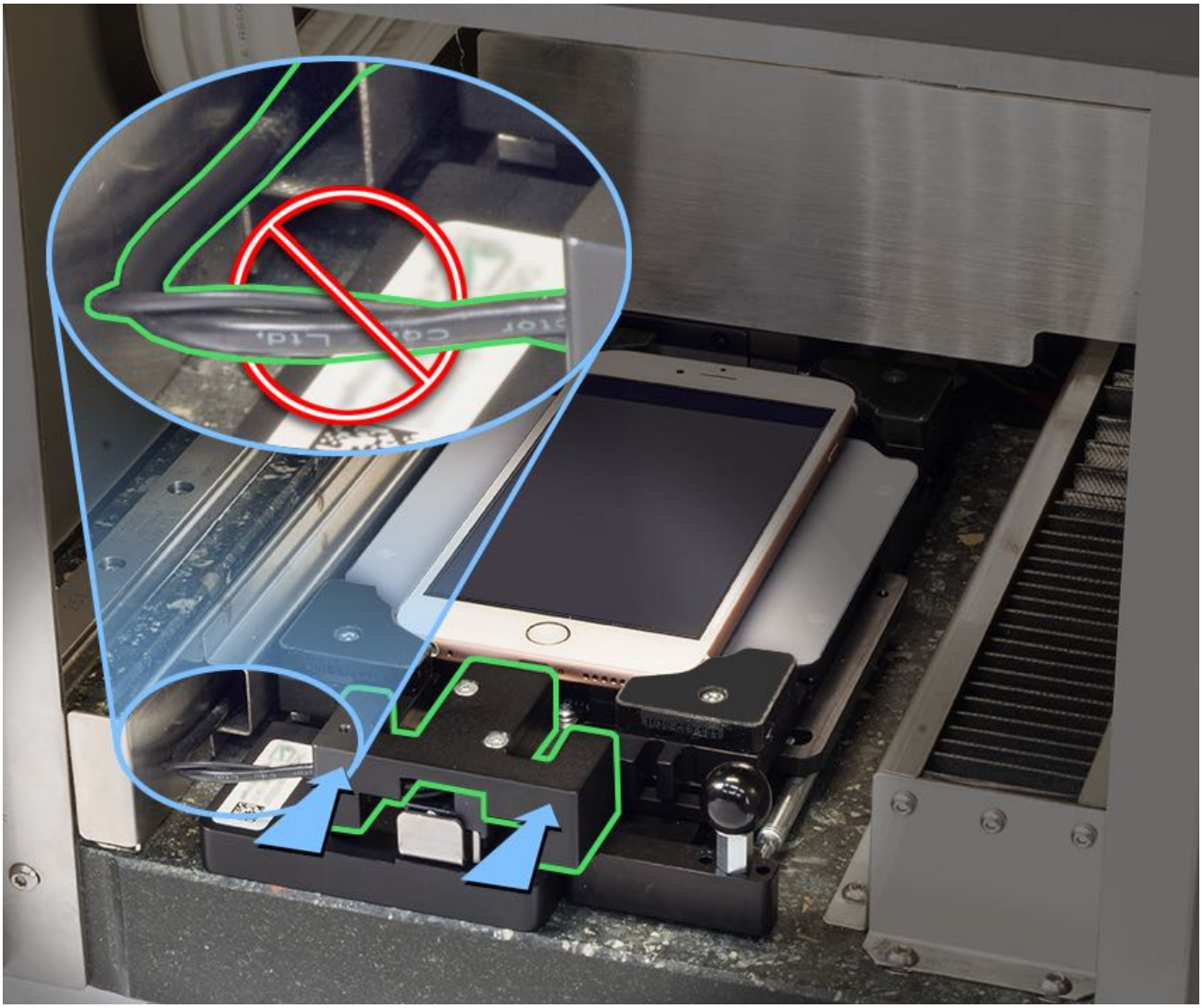
Calibration Procedure

1. Verify the following before beginning the calibration procedure:
   - The calibration fixture is turned on.
   - The iPhone has at least 20 percent battery charge.
2. Verify that the calibration fixture door is clear of any obstructions. Close the 3D Touch Calibration Fixture door.
3. Launch the 3D TouchCal software, located in the Applications folder of the iMac. **Note:** If you receive an error, then quit the 3D TouchCal software, turn the fixture off and back on again, restart the computer, and relaunch the software.
4. When prompted, open the door, slide the black handle towards the door opening, and insert the iPhone into the calibration fixture. Align the camera with the cutout on the tray.
   Important: Do not open the door until the software prompt appears.
5. Slide the black handle toward the back of the fixture until the iPhone is held firmly in place.



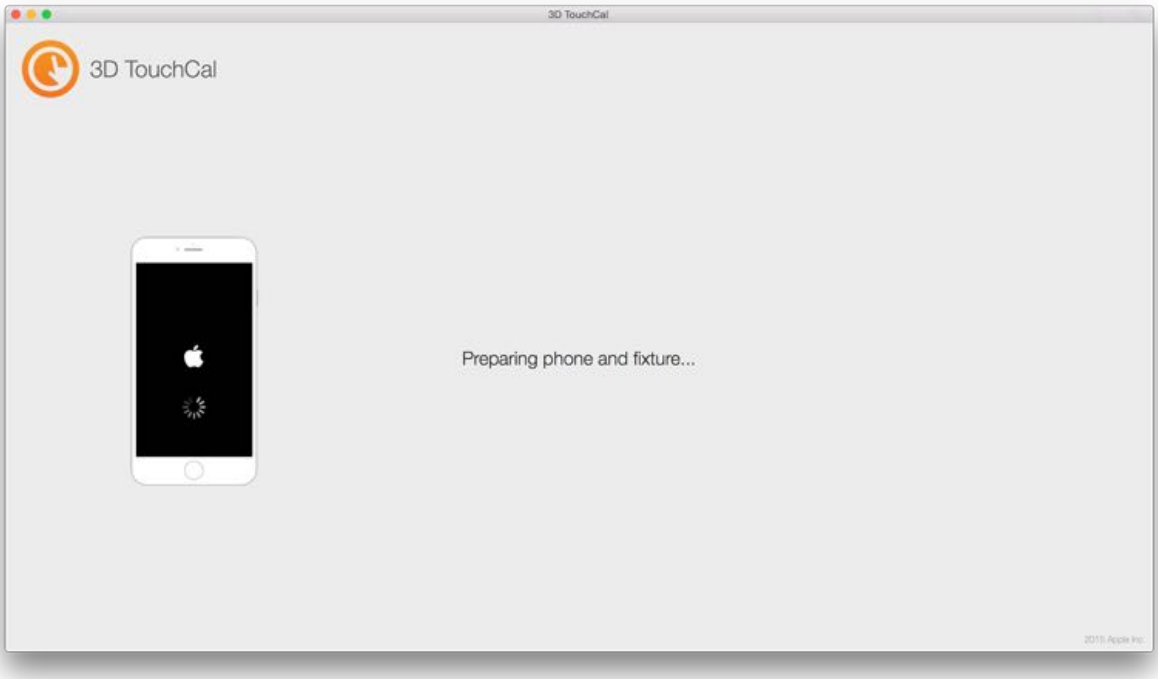
6. Remove the protective film covering from the new display assembly.
Important: Do not touch the display after cleaning. Finger oils cause test anomalies.

7. Slide the connector carrier to plug in the USB to Lightning device under test (DUT) cable. **Important:** Do not use the cable on the left side of the carrier to plug in the Lightning connector. Using this cable will damage the fixture.

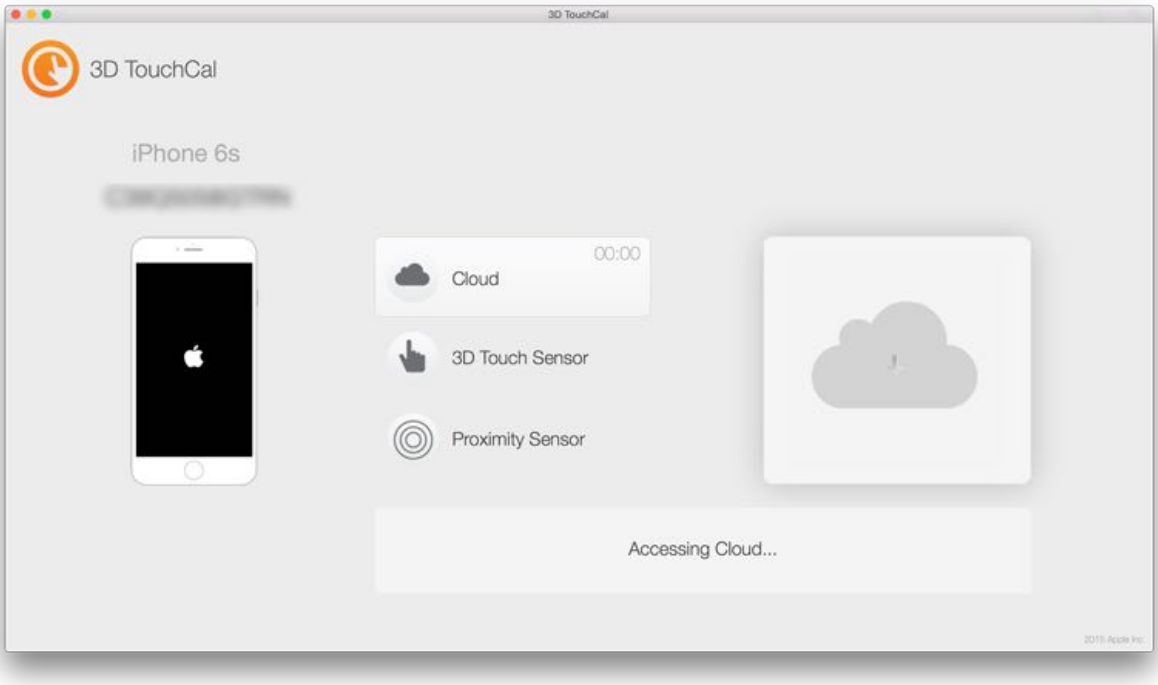


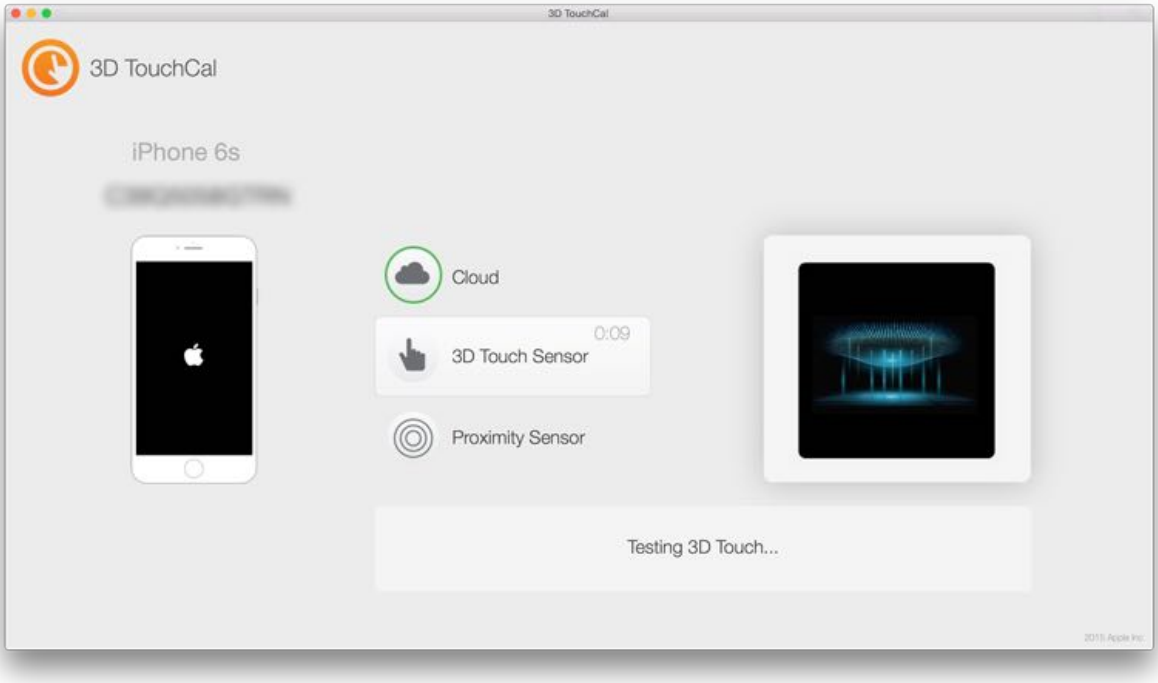
8. Verify that the calibration fixture door is clear of any obstructions. Close the 3D Touch Calibration Fixture door.

Warning: Do not attempt to open the door during testing. The 3D Touch Calibration Fixture contains moving parts.

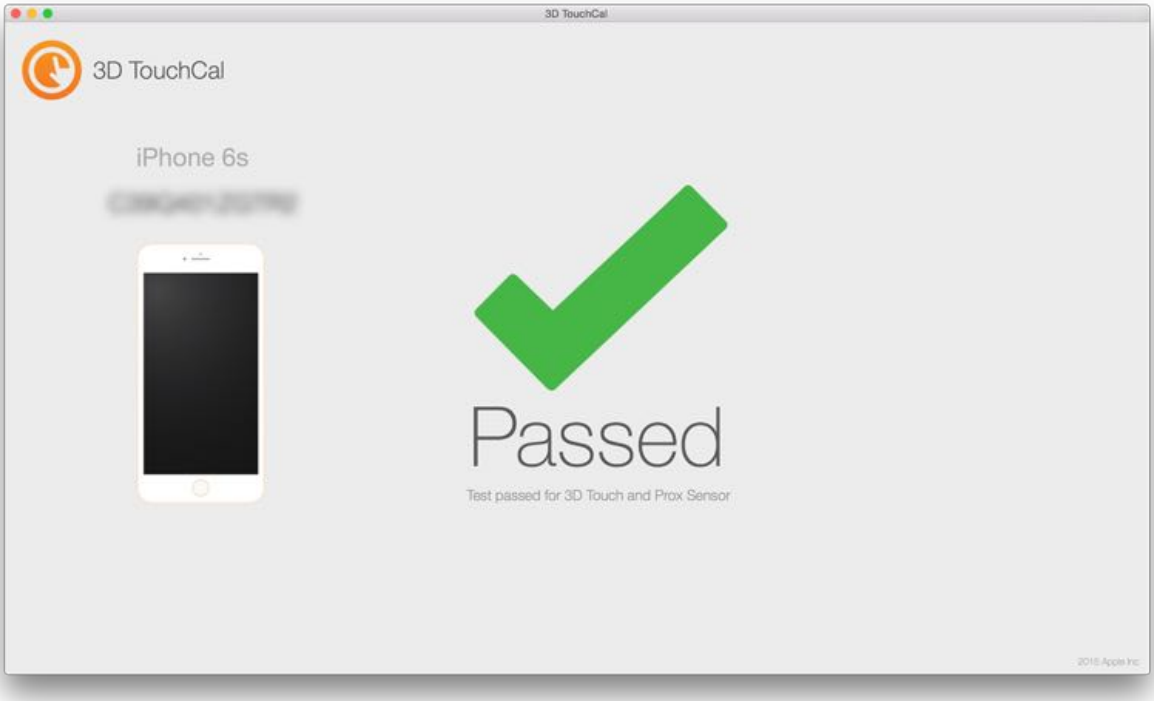


Note: Display calibration will take approximately 12 minutes. If calibration fails, then run the calibration again by repeating steps 3 through 10.





9. When calibration is complete, wait for the Apple logo to appear on the display of the calibrated iPhone before opening the door to remove the iPhone from the fixture.
   Note: If the Apple logo does not appear, then run the calibration process again by repeating steps 3 through 10.



10. Slide the connector carrier to unplug the USB to Lightning device under test cable. **Important:** Do not use the cable on the left side of the carrier to unplug the Lightning connector. Using this cable will damage the fixture.
11. Slide the black handle toward the door opening and remove the iPhone from the calibration fixture.
12. Interpret the calibration results:
    - **PASS:** If calibration passes, then perform all functional tests in article TP1045: Functional Test.
    - **FAIL:** If calibration fails, follow these steps:
        - Follow software prompts.
        - Reset the iPhone. **Note:** The phone may be in recovery mode. This is expected. Attempt calibration again with the phone in recovery mode.
        - Attempt display calibration again. **Important:** Use an alternate fixture if available.

    If the calibration fails again, then reseat the cables and attempt calibration again in the last used fixture. Clean the iPhone display with a lint-free cloth before attempting calibration.

    If reseating does not resolve the issue, replace the whole unit. Note the failure in the repair and process the part as DOA.

    If the 3D Touch Calibration Fixture fails to function, refer to article TP1571: Troubleshooting the 3D Touch Calibration Fixture.

For fixture setup instructions, technical specifications, and electrical and operating requirements, refer to article TP1547: 3D Touch Calibration Fixture Setup.

Label	Definition
	**Hand crush hazard**
	**Electric shock hazard**

The EU Declaration of Conformity for this fixture can be found in article SM264: Declaration of Conformity for Horizon Fixture 661-02459.

Internal Checks

Missing Internal Parts

If any internal components or parts are missing, refer to article SM252: iPhone Visual/Mechanical Inspection (VMI) Guide, 070-00167 for service eligibility.

Liquid Contact Indicators

If a liquid contact indicator (LCI) is activated (red), then it indicates that the iPhone has had contact with liquid. Refer to article SM252: iPhone Visual/Mechanical Inspection (VMI) Guide, 070-00167 for service eligibility.

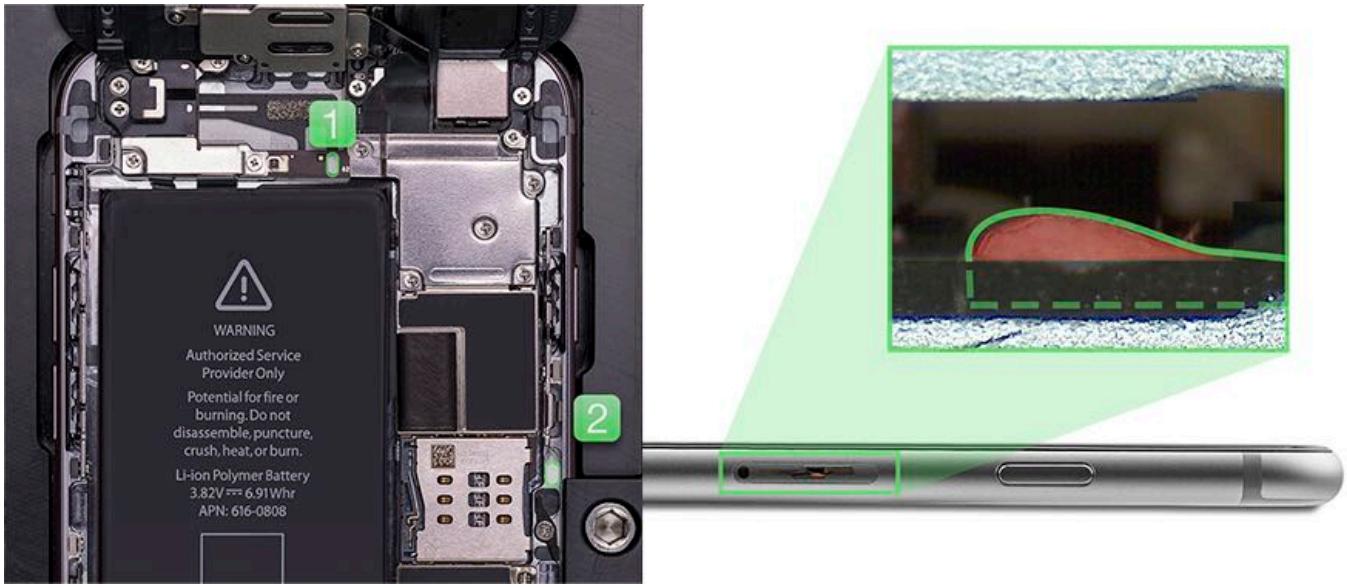
Important: If an internal LCI is activated or if corrosion is present, then reassemble the device and do not proceed with any modular repair.

iPhone 6

The iPhone 6 contains two internal liquid contact indicators:

1. To the left of the main camera above the battery
2. Near the SIM reader (externally visible)

Note: Remove the SIM tray from the iPhone to view the externally visible LCI. Refer to article RP1194: SIM Tray.

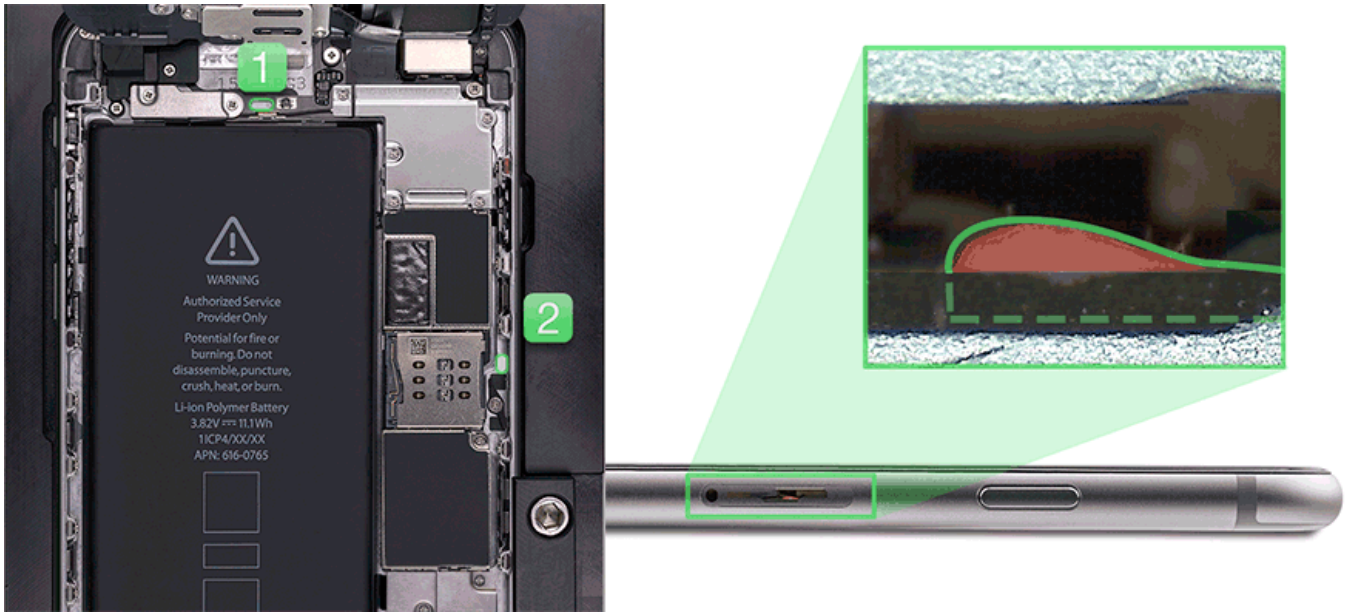


iPhone 6 Plus

The iPhone 6 Plus contains two internal liquid contact indicators:

1. To the left of the main camera above the battery
2. Near the SIM reader (externally visible)

Note: Remove the SIM tray from the iPhone to view the externally visible LCI. Refer to article RP1194: SIM Tray.



iPhone 6s

The iPhone 6s contains two internal liquid contact indicators:

1. To the left of the main camera above the battery
2. Near the SIM reader (externally visible)

Note: Remove the SIM tray from the iPhone to view the externally visible LCI. Refer to article RP1194: SIM Tray.

iPhone 6s Plus

The iPhone 6s Plus contains two internal liquid contact indicators:

1. To the left of the main camera above the battery
2. Near the SIM reader (externally visible)

Note: Remove the SIM tray from the iPhone to view the externally visible LCI. Refer to article RP1194: SIM Tray.

iPhone 7

The iPhone 7 contains two internal liquid contact indicators:

1. To the left of the main camera above the battery
2. On the display assembly (not shown, externally visible)

Note: Remove the SIM tray from the iPhone to view the externally visible LCI. Refer to article RP1194: SIM Tray.

iPhone 7 Plus

The iPhone 7 Plus contains two internal liquid contact indicators:

1. To the left of the main camera above the battery
2. On the display assembly (not shown, externally visible)

Note: Remove the SIM tray from the iPhone to view the externally visible LCI. Refer to article RP1194: SIM Tray.

iSight Camera

First Steps

- Open Device

Important:

- This procedure should only be performed by Apple-certified technicians.
- Wear nitrile or lint-free gloves to prevent contamination of the camera lens.
- When entering the serial number for the repair transaction, use the serial number of the wider camera closest to the right side of the enclosure.

For video instruction, refer to article SV319: iPhone 7 Plus Camera Replacement Video.

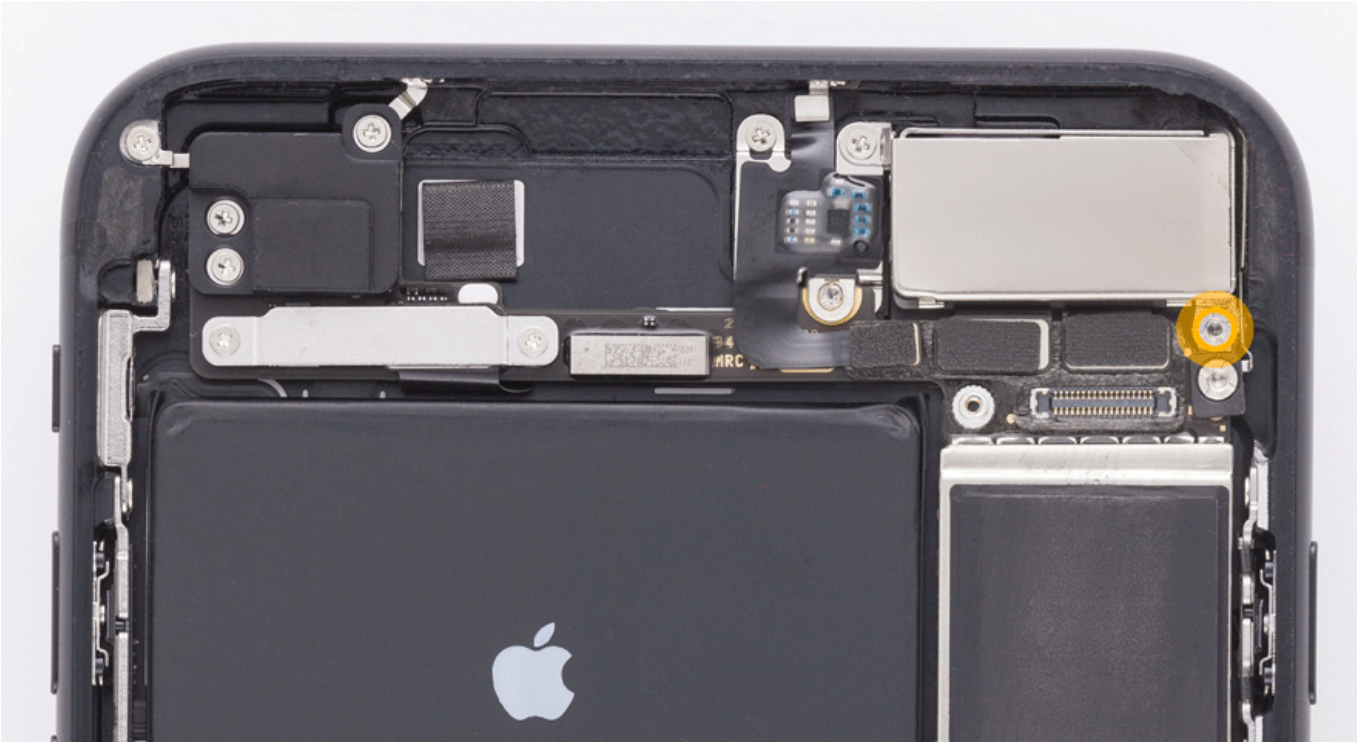
Tools

1. iPhone torque driver (green) (923-00105)
2. JCIS bit (923-0246) for cross-head screws
3. Superscrew bit (923-01289)
4. ESD-safe tweezers
5. Black stick (922-5065)
6. Nitrile or lint-free gloves

Steps For Removal

1. Use the iPhone torque driver (green) and JCIS bit to remove and discard one cross-head screw from the camera cowling.

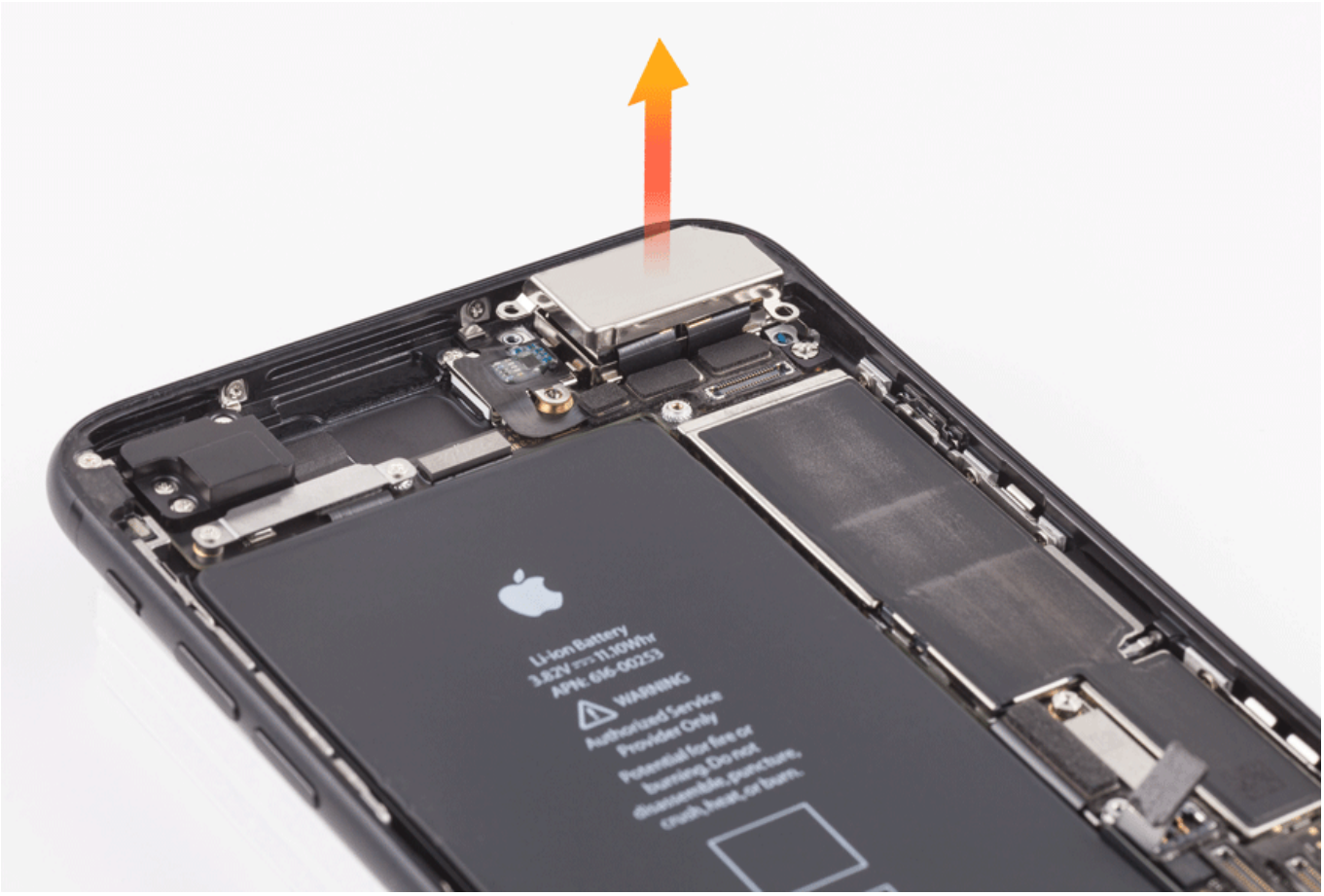
2. Use the iPhone torque driver (green) and superscrew bit to remove and discard one superscrew from the camera cowling.



3. Remove the camera cowling.

If the camera cowling looks like the cowling pictured below, then replace the cowling with 923-01805.

If the camera cowling looks like the cowling pictured below, then save for reuse.



4. Use the flat end of a black stick to disconnect two camera flex connectors from the logic board.

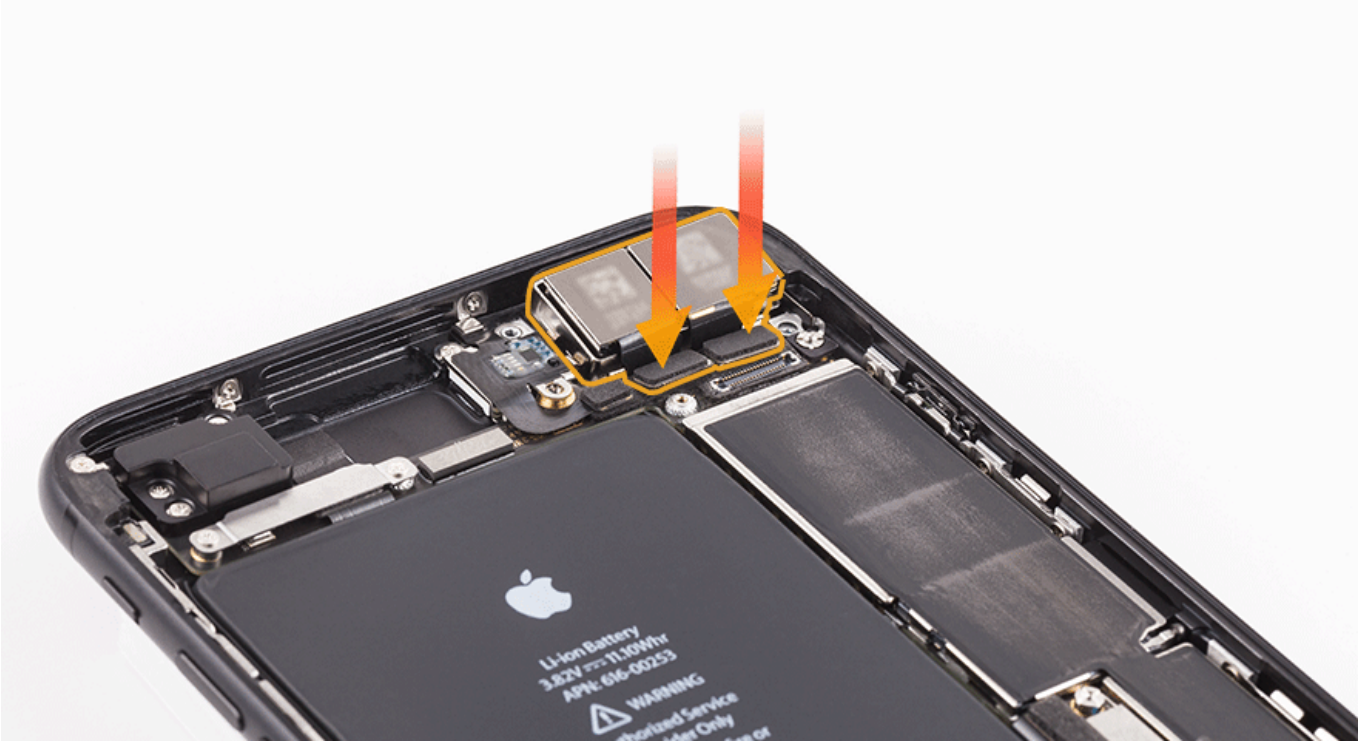
5. Remove the camera from the enclosure.

Steps For Reassembly

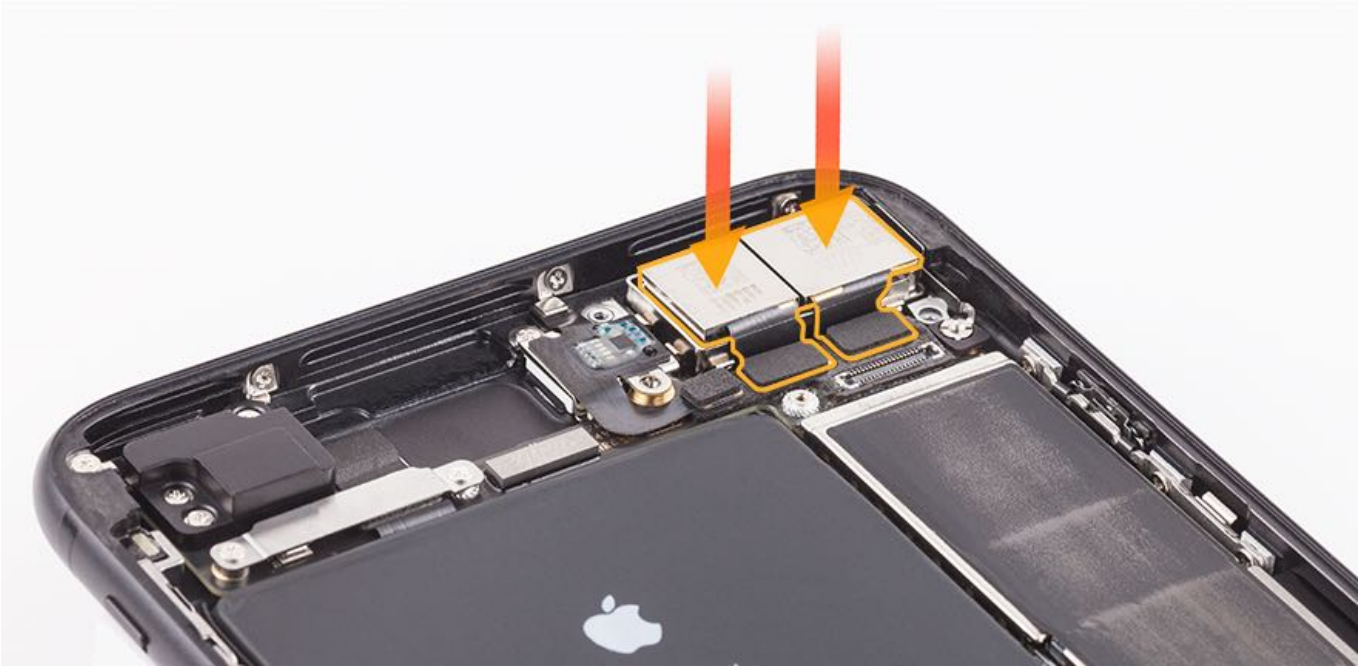
1. Wearing nitrile gloves, remove the protective lens cover from the replacement camera.

2. Position the camera in the enclosure.

3. Connect the two camera flex connectors to the logic board.



4. Gently seat the cameras in the enclosure.



5. Place the camera cowling (923-01805) on the camera. Make sure the cowling looks like the cowling pictured below.

6. Use the iPhone torque driver (green) and JCIS bit to install the camera cowling with one **new** cross-head screw (923-01261).

7. Use the iPhone torque driver (green) and superscrew bit to install a **new** superscrew (923-01596) into the camera cowling.

8. Follow the reassembly steps in article RP1333: Open Device.

9. **Important:** Check iPhone operation using the steps in article TP1045: Functional Test.

Battery

First Steps

- Review article TP328: iPhone Safety
- Perform the Open Device procedure.

Important: This procedure should only be performed by Apple-certified technicians.

Warning: If the battery is dented, punctured, swollen, or otherwise damaged, then **stop the repair**. Do not remove the battery from the device. Reassemble and replace the whole unit.
Refer to articles TP328: iPhone Safety and HT204762: Enclosure separation due to expanded battery.

Warning: Do not reuse or reinstall a loose battery or a battery that has been removed. Replace it with a new battery. If a new battery is unavailable, replace the whole unit.

For video instruction, refer to article SV318: iPhone 7 Plus Battery Replacement Video.

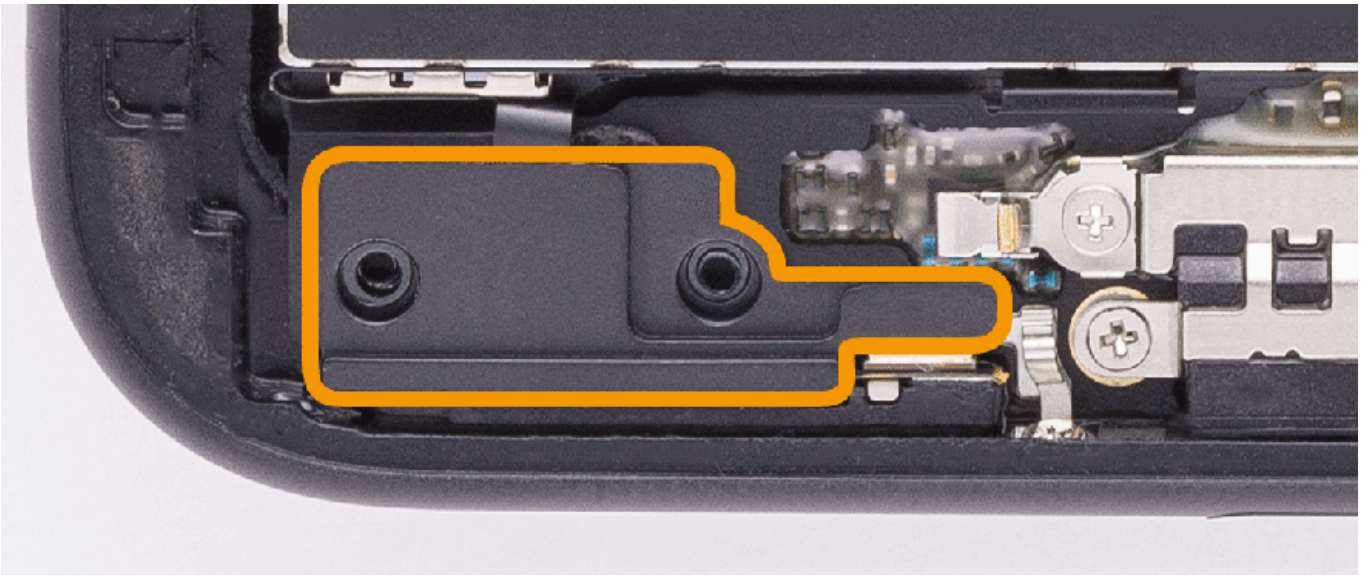
Tools

1. iPhone torque driver (green) (923-00105)
2. JCIS bit (923-0246) for cross-head screws
3. ESD-safe tweezers
4. Black stick (922-5065)
5. 5.5-inch repair tray (923-01292)
6. Isopropyl alcohol (IPA) wipes
7. iPhone Battery Fixture (923-00065)

Steps For Removal

1. Use the iPhone torque driver (green) and JCIS bit to remove and discard two cross-head screws from the Taptic Engine flex cowling.

2. Remove Taptic Engine flex cowling. Save for reuse.



3. Use a black stick to disconnect Taptic Engine flex from enclosure.

4. Use the iPhone torque driver (green) and JCIS bit to remove and discard three cross-head screws from the Taptic Engine.

5. Remove the Taptic Engine from the enclosure.

6. Use ESD-safe tweezers to gently lift the battery adhesive tabs from the battery.

7. Grasp one adhesive strip and slowly pull it toward the bottom of the iPhone. As the adhesive strip extends, grasp the strip closer to the battery and continue to pull slowly. Hold the battery with your fingers. **Note:** If an adhesive strip breaks, then attempt to retrieve the strip with ESD-safe tweezers. If the strip cannot be retrieved, then attempt to remove other strips.

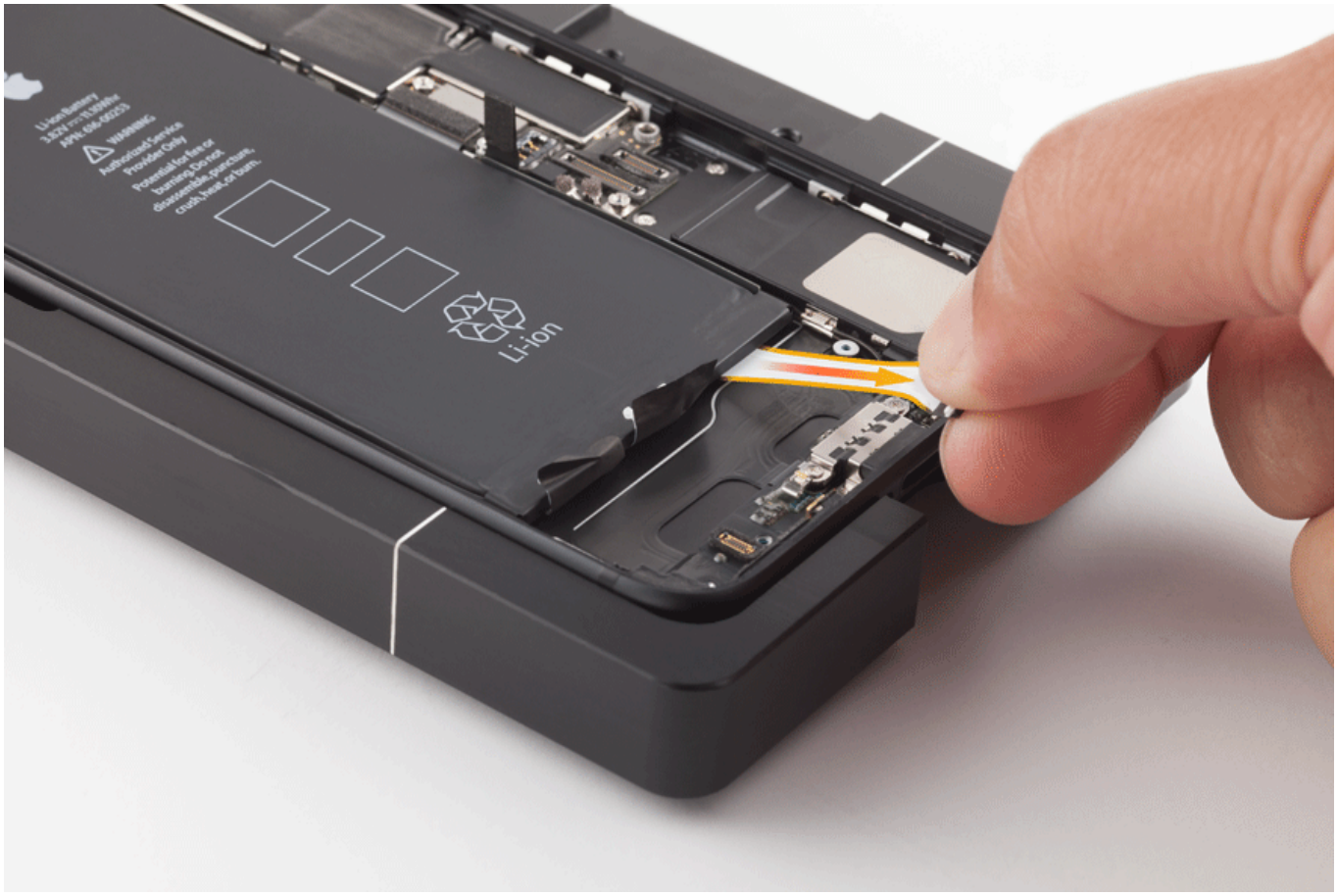
Important: Avoid pulling the adhesive strips against components or screws.

Warning: If an adhesive tab or strip breaks off and cannot be retrieved, then **do not use tools to pry up the battery.** In this situation, replace the whole unit.

8. Continue to pull slowly until the adhesive strip releases.

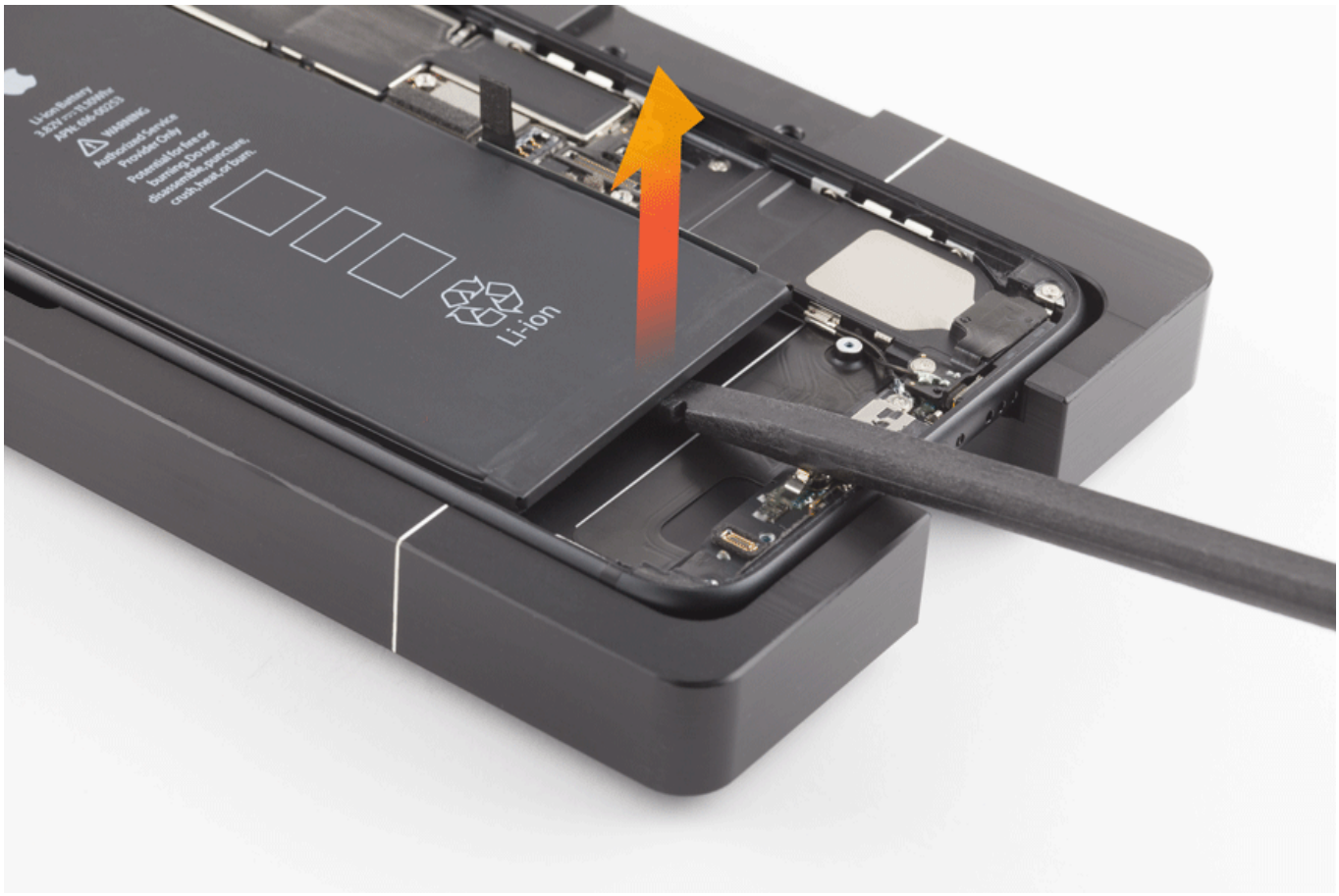
9. Repeat steps 7 and 8 with the other adhesive strips.

Note: If the adhesive strip breaks, then attempt to retrieve the strip with ESD-safe tweezers. If the strip cannot be retrieved, then attempt step 10.



10. Gently use a black stick to lift the battery from the bottom edge.

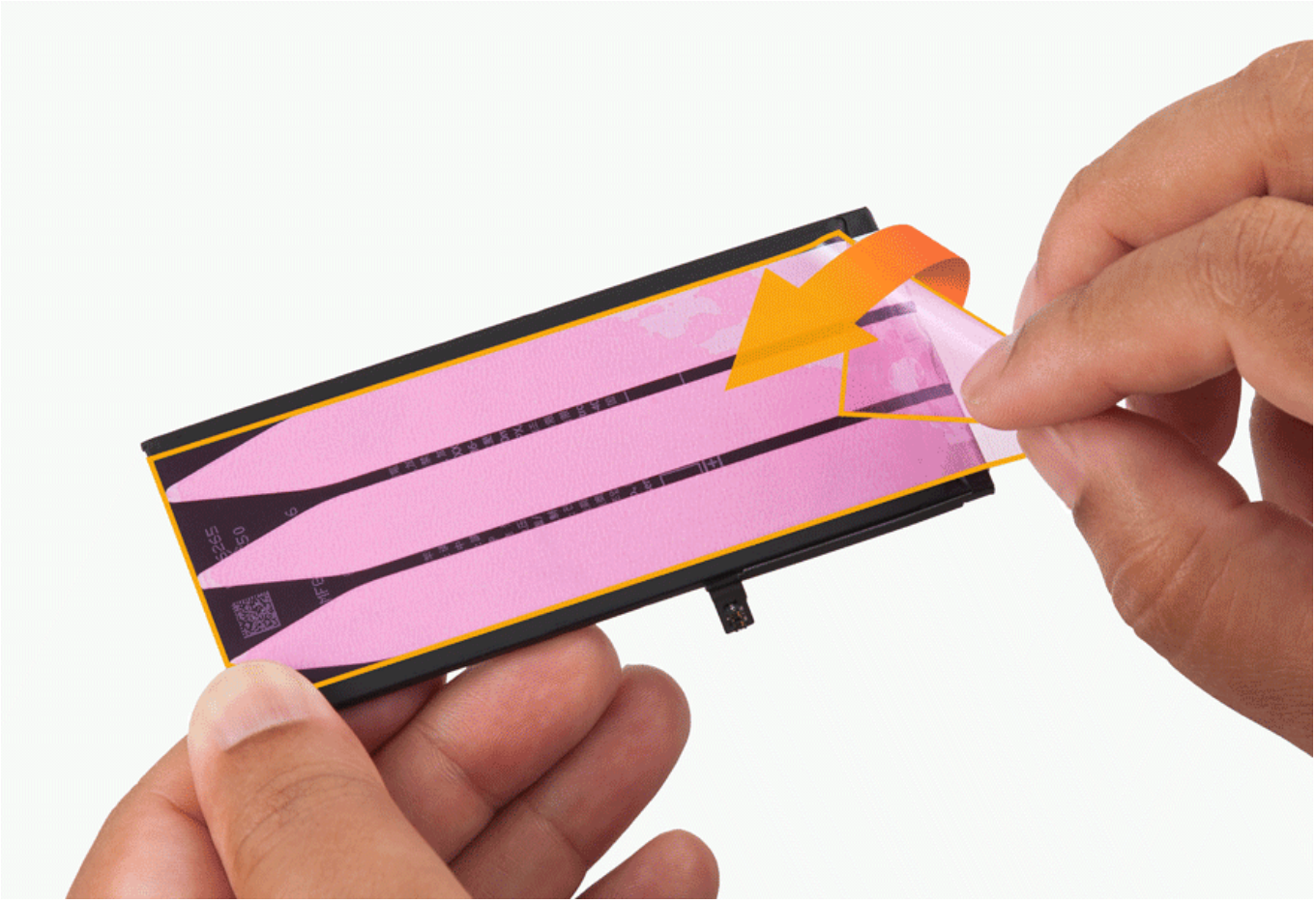
Warning: If you feel any resistance, then **stop the repair**. Reinstall the display assembly and replace the whole unit.



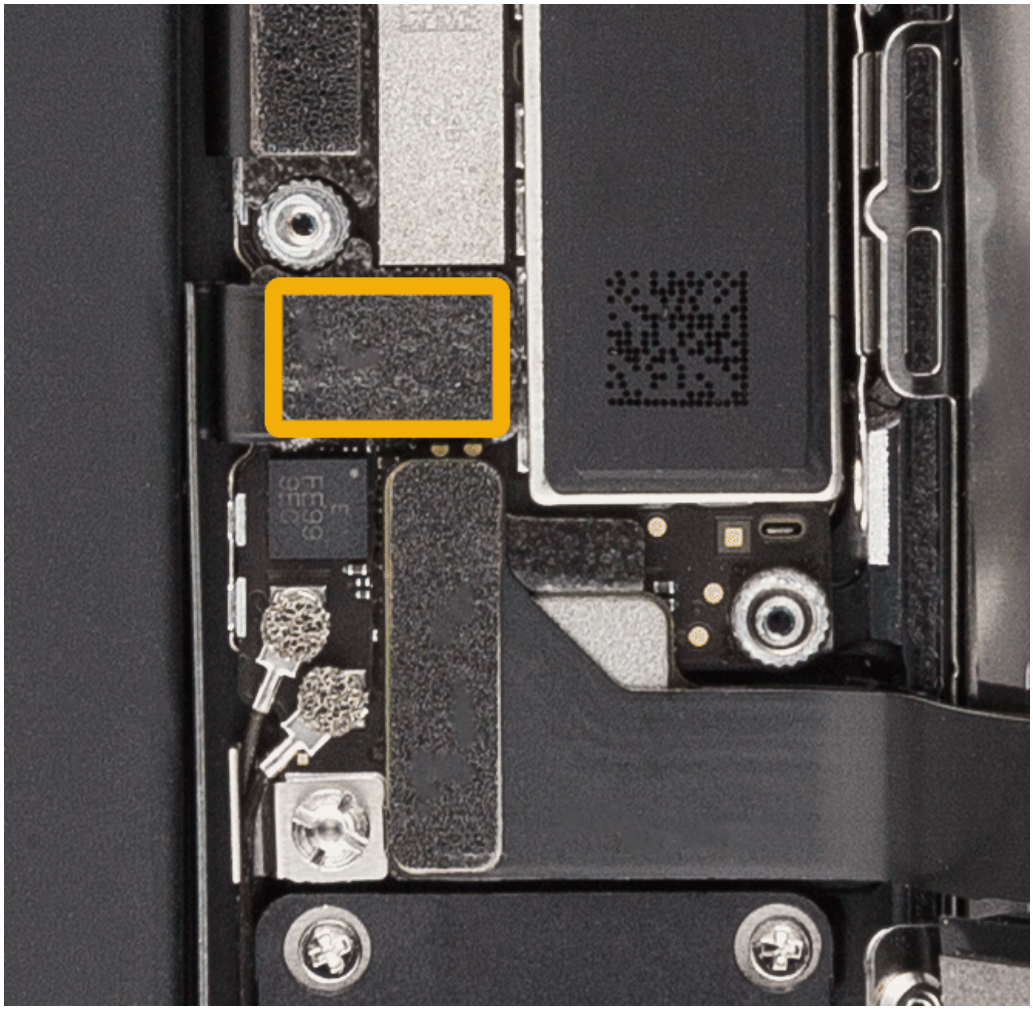
11. Use IPA wipes to remove any remaining adhesive from the enclosure underneath the battery.

Steps For Reassembly

1. Peel the pink release liner from the battery to expose the adhesive that will attach to the enclosure.



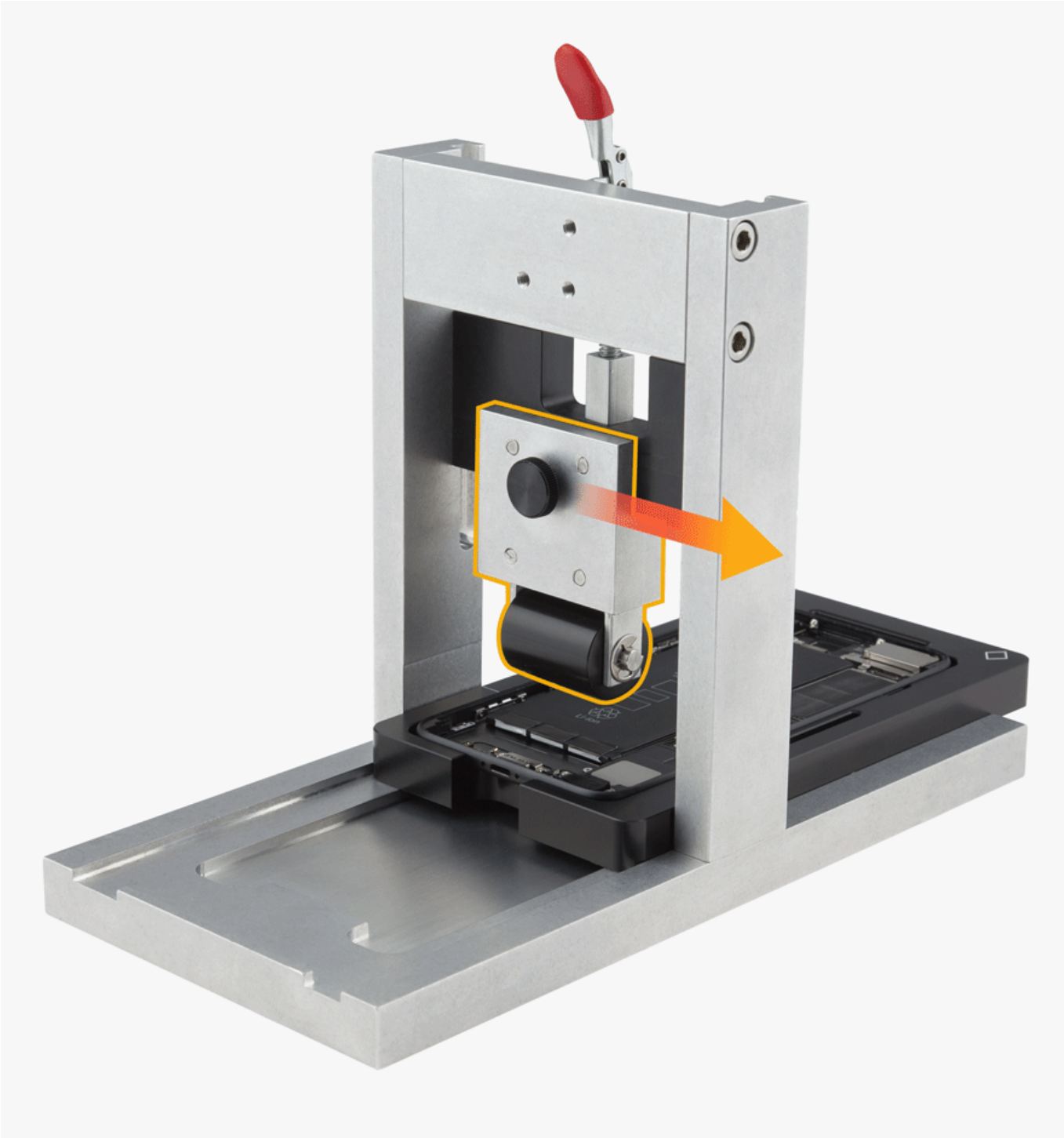
2. Position the right edge of the battery in the enclosure and connect the battery connector to the logic board. **Note:** Connecting the battery in this step ensures the battery is positioned correctly within the enclosure and the battery flex is not damaged.



3. Carefully lay the battery down into the enclosure, checking that it is centered.

4. Ensure that the iPhone Battery Fixture roller is set to the center position. Loosen the thumb screw and adjust if needed.

Important: The roller should be moved to end of its range of motion when adjusted.



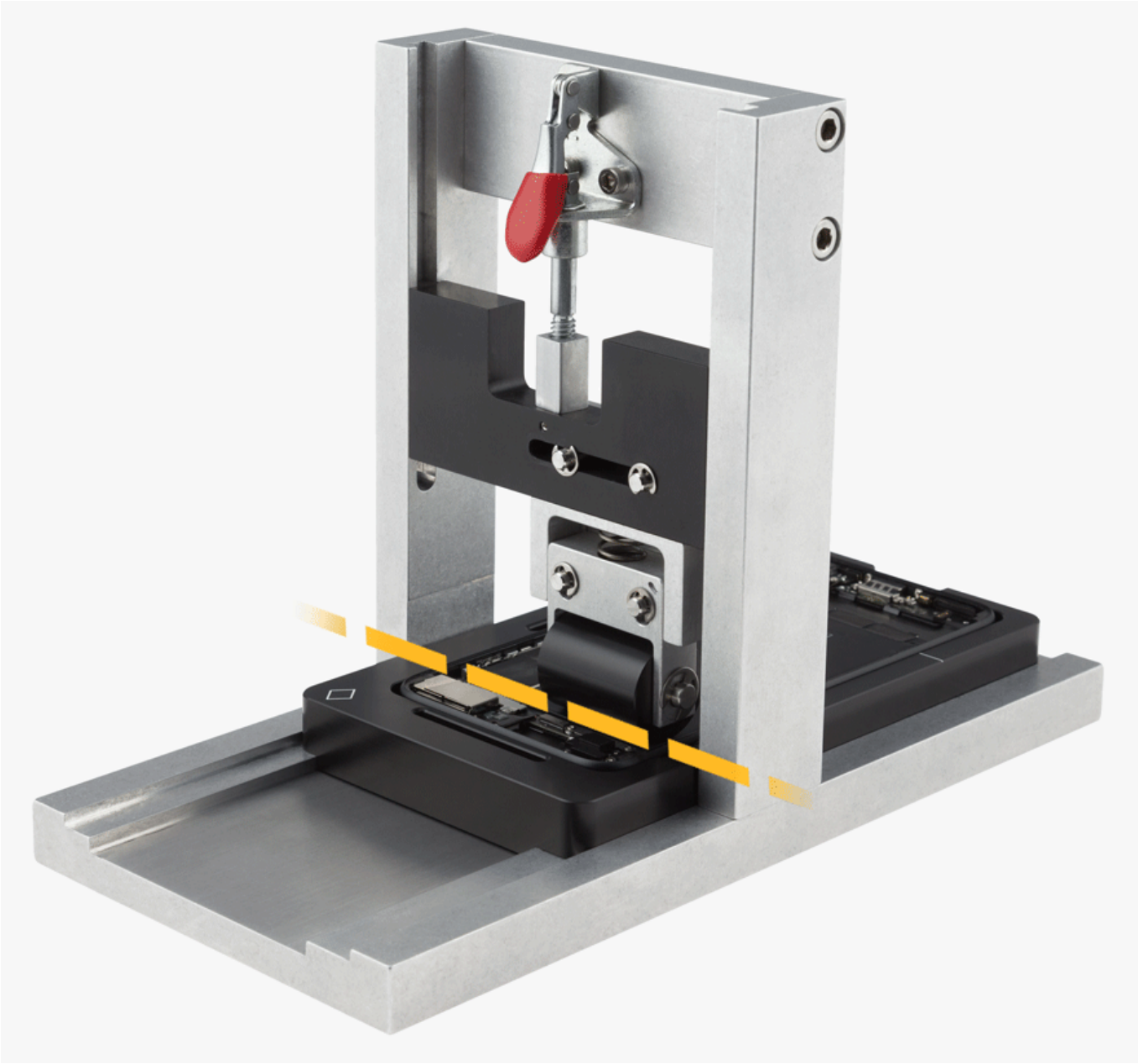
5. Put the repair tray into the iPhone Battery Fixture with the battery positioned underneath the roller. Align the white marks on the tray with the front edge of the vertical tower.

Important: The roller must be in the center position.

6. Lower the red lever to move the pressure roller into place above the iPhone battery.

7. Slide the tray through the tower. This will cause the roller to press the battery down onto the adhesive strip.

Important: Stop sliding at the top edge of the battery. Do not roll over the components above the battery.

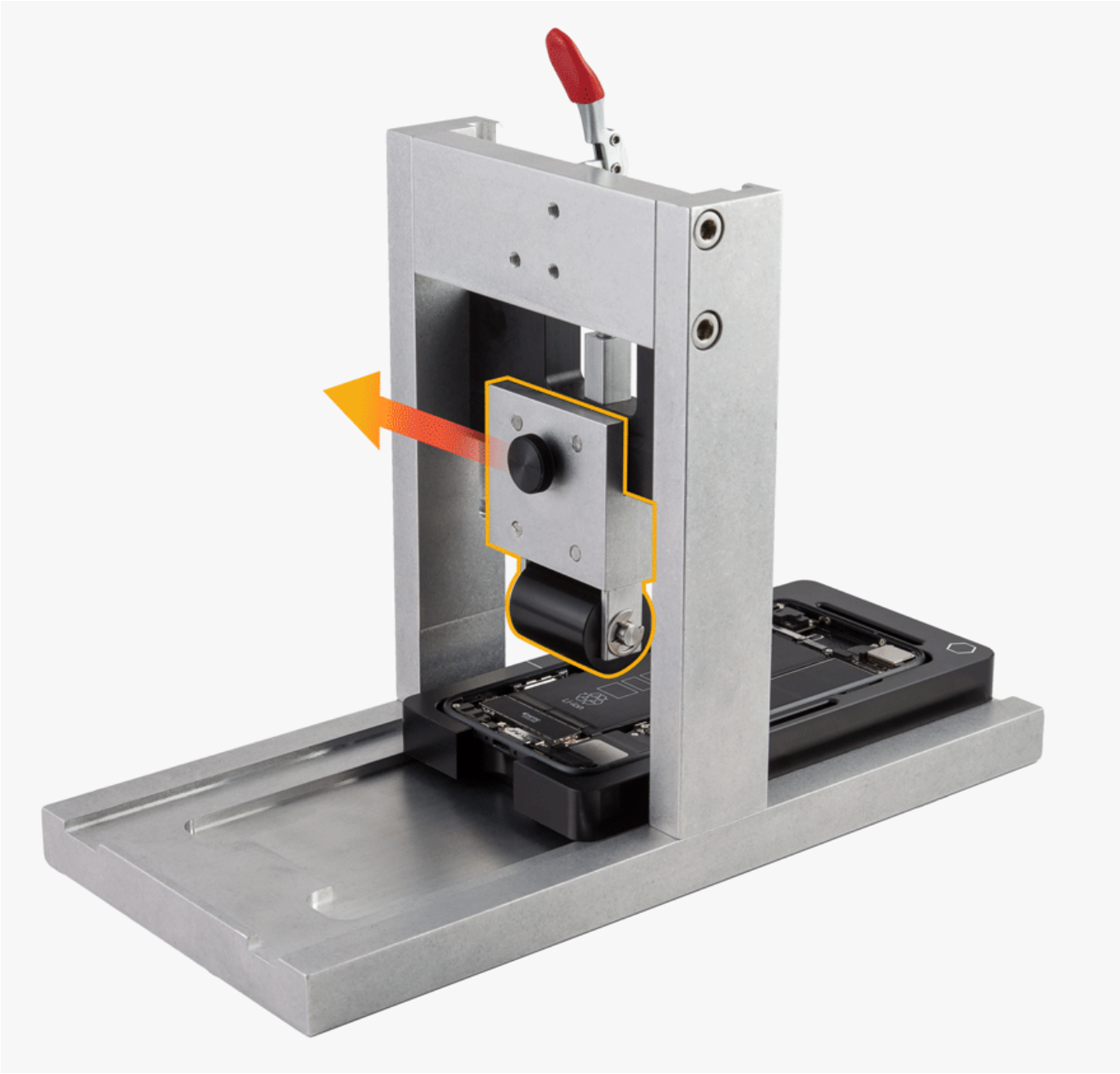


8. Slide the tray back through the vertical tower to the original position.

Important: Only slide the tray back to the point where the white marks align with the front of the tower.

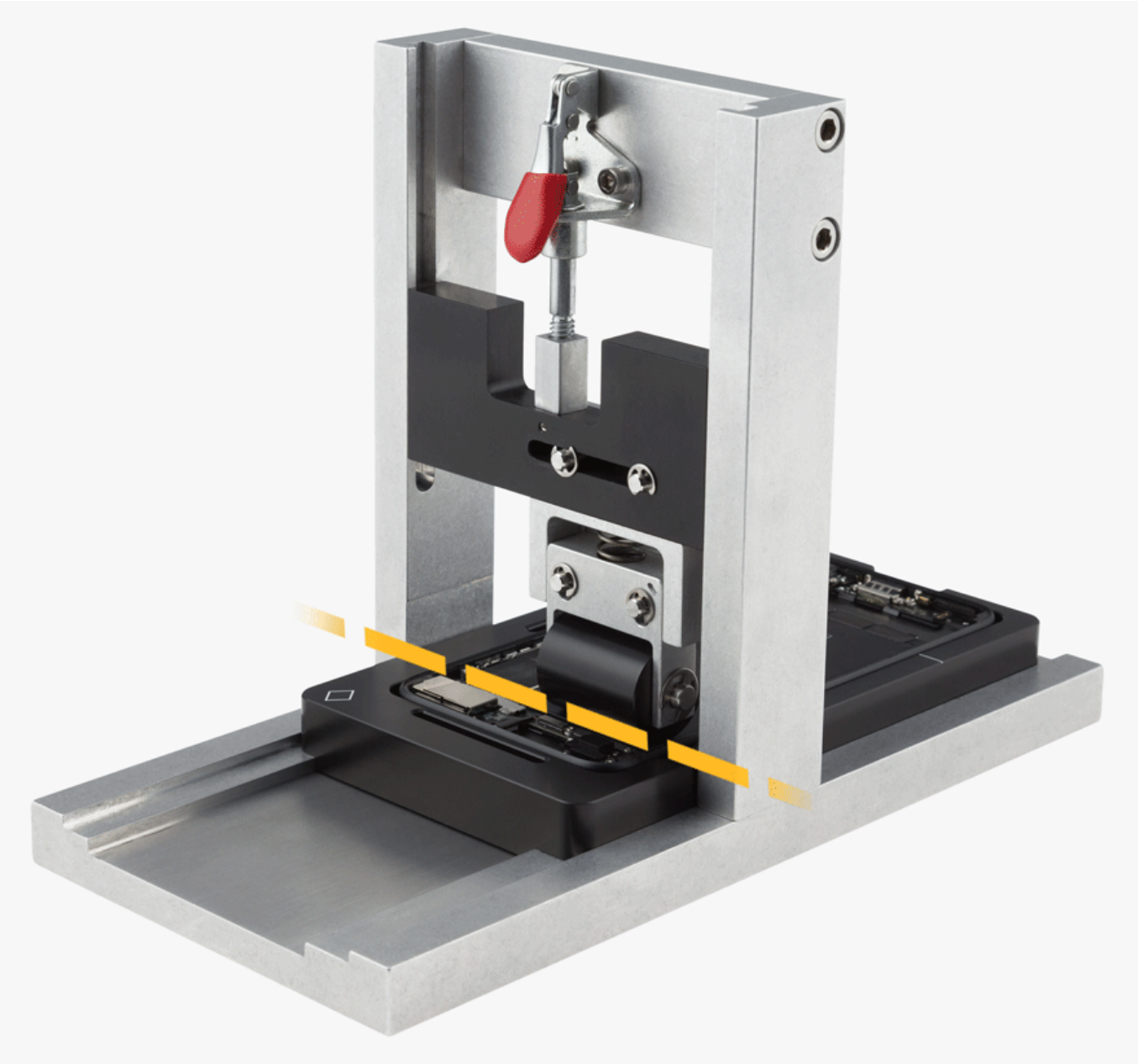
9. Raise the red lever to raise the pressure roller.

10. Loosen the thumb screw and slide the roller to the left position. **Important:** The roller should be moved to the end of its range of motion when adjusted.



11. Lower the red lever to move the pressure roller into place above the iPhone battery.

12. Slide the tray through the tower. This will cause the roller to press the battery down onto the adhesive strip. **Important:** Stop sliding at the top edge of the battery. Do not roll over the components above the battery.



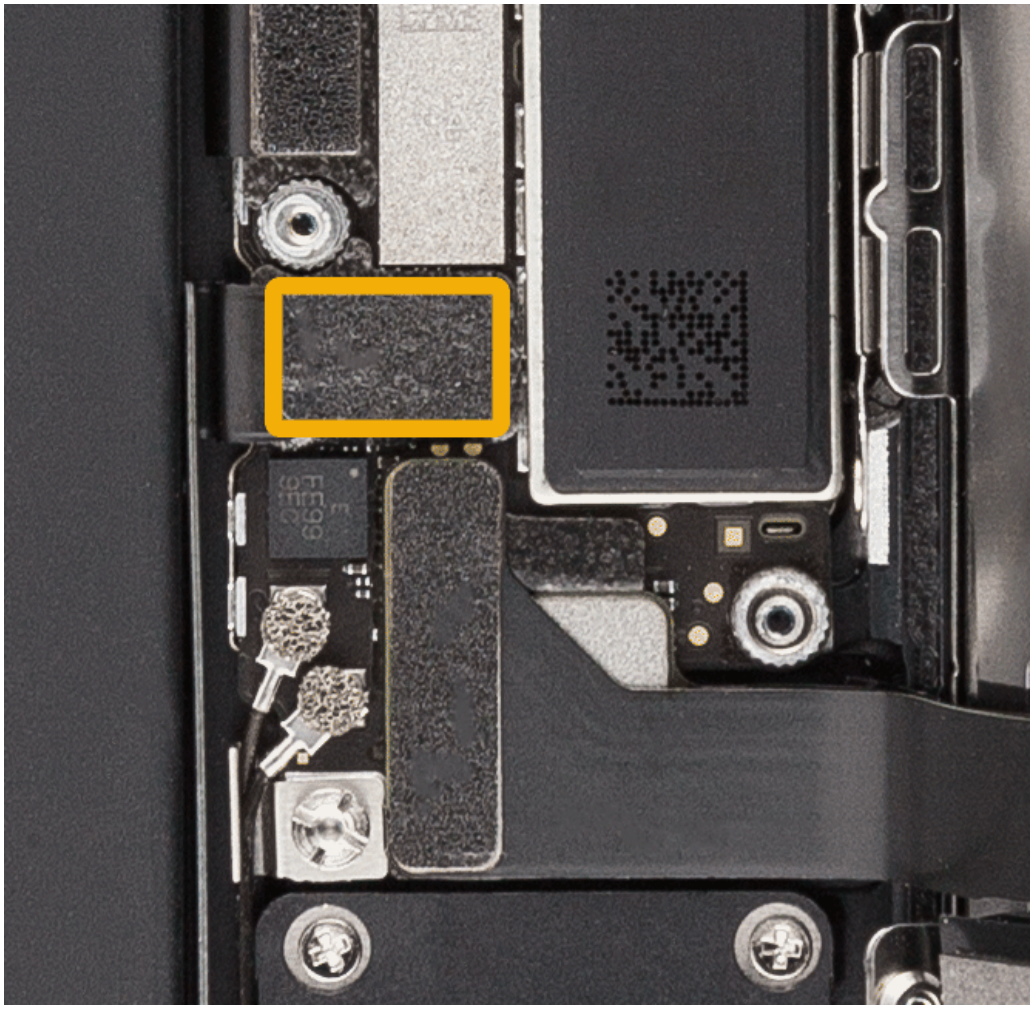
13. Slide the tray back through the tower to the original position.

Important: Do not slide the tray back beyond the point where the white marks align with the front of the tower.

14. Raise the red lever to raise the pressure roller.

15. Remove the tray from the fixture.

16. Use a black stick to disconnect the battery connector from the logic board.

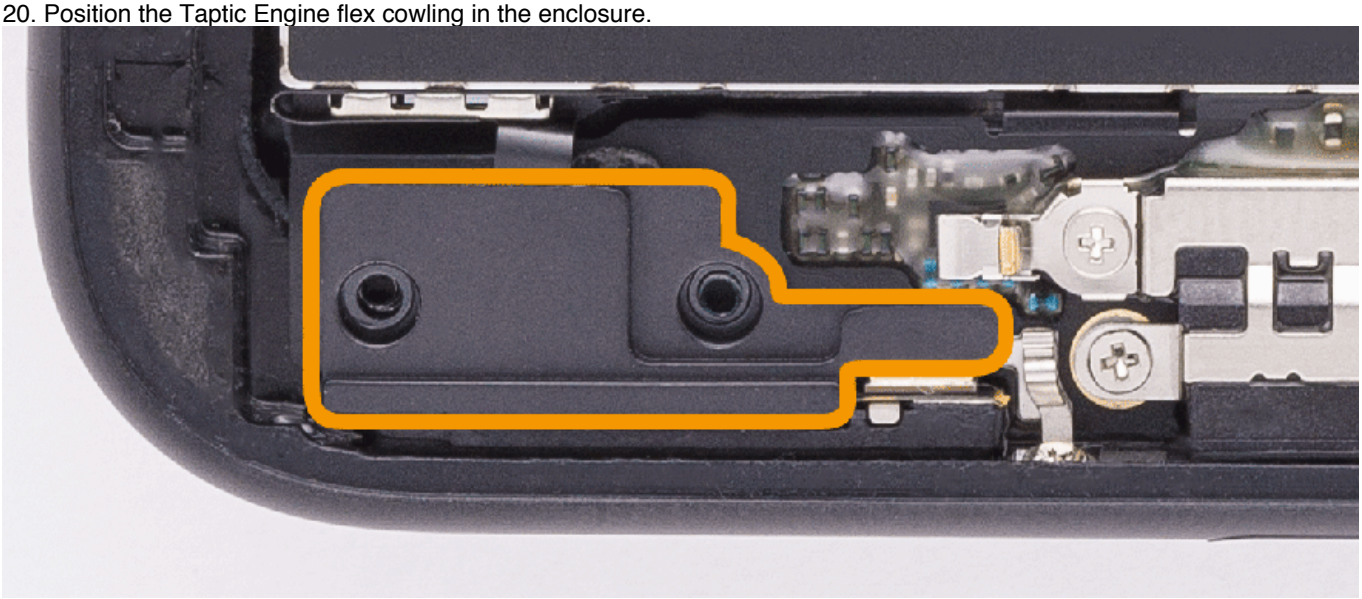


17. Connect Taptic Engine flex.

18. Position the Taptic Engine in the enclosure.

19. Use the iPhone torque driver (green) and JCIS bit to install the Taptic Engine with three new cross-head screws (923-01266). **Important:** Do not reuse old screws.

20. Position the Taptic Engine flex cowling in the enclosure.



21. Use the iPhone torque driver (green) and JCIS bit to install the Taptic Engine flex cowling with two new cross-head screws.

- 923-01268, left
- 923-01269, right

Important: Do not reuse old screws.

22. Follow the reassembly steps in article RP1333: Open Device.

23. Gently shake the iPhone and listen for a battery rattling sound. If the battery is moving, then open device, repeat reassembly steps 4-15, and close device. If rattling still occurs, then replace the battery with a new battery.

24. **Important:** Check iPhone operation using the steps in article TP1045: Functional Test.

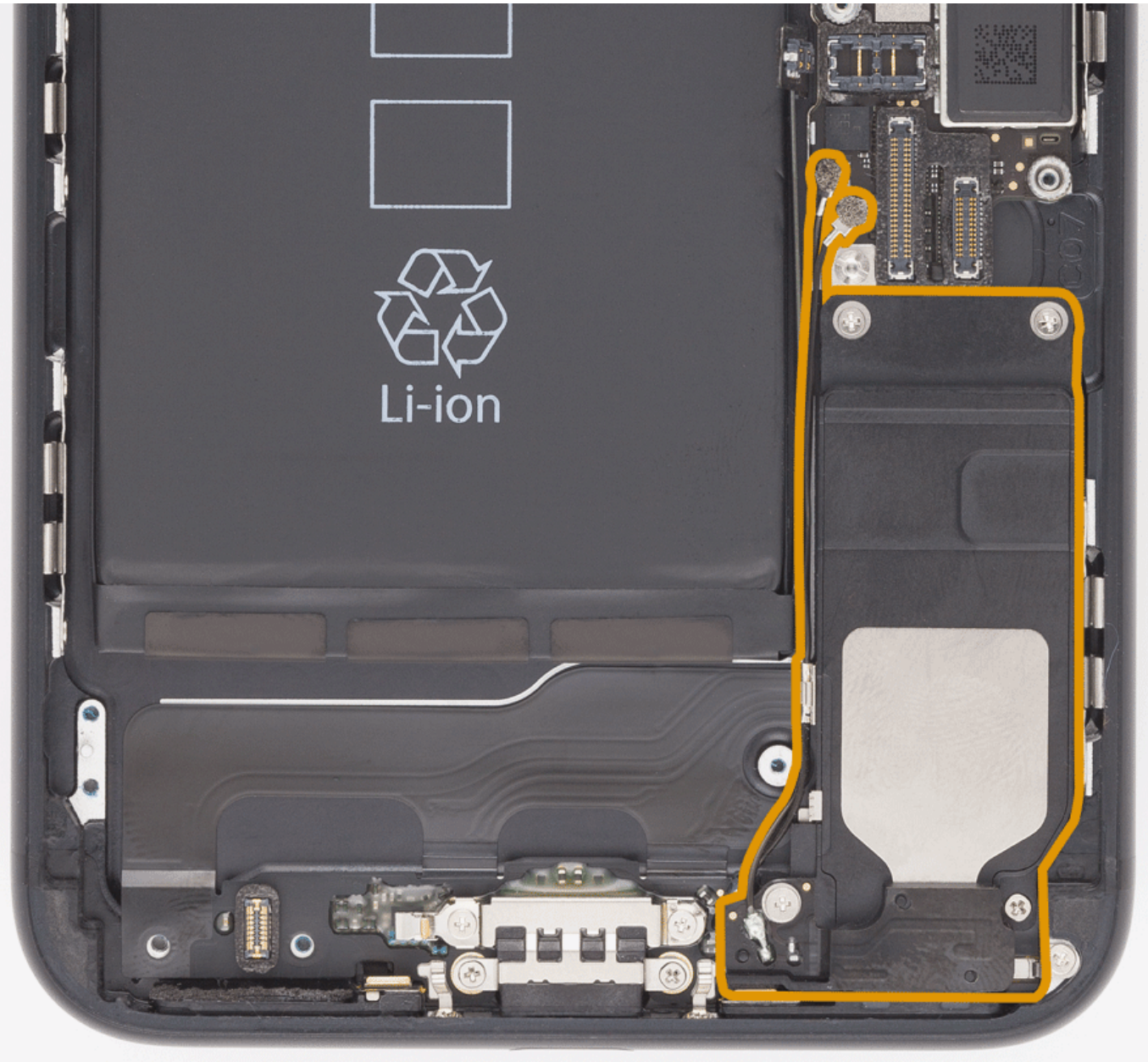
Speaker

First Steps

- Perform the Open Device procedure.

Important: This procedure should only be performed by Apple-certified technicians.

For video instruction, refer to article SV322: iPhone 7 Plus Speaker Replacement Video.



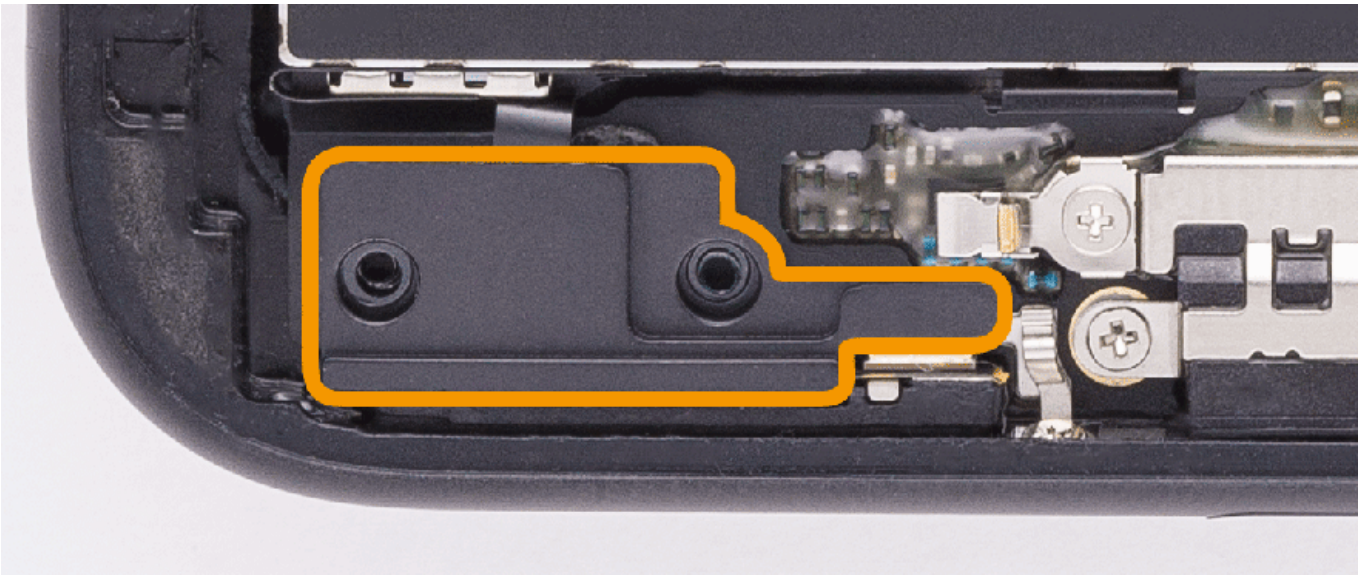
Tools

1. ESD-safe tweezers
2. iPhone torque driver (green) (923-00105)
3. JCIS bit (923-0246) for cross-head screws
4. Black stick (922-5065)

Steps For Removal

1. Use the iPhone torque driver (green) and JCIS bit to remove and discard two cross-head screws from the Taptic Engine flex cowling.

2. Remove Taptic Engine flex cowling. Save for reuse.



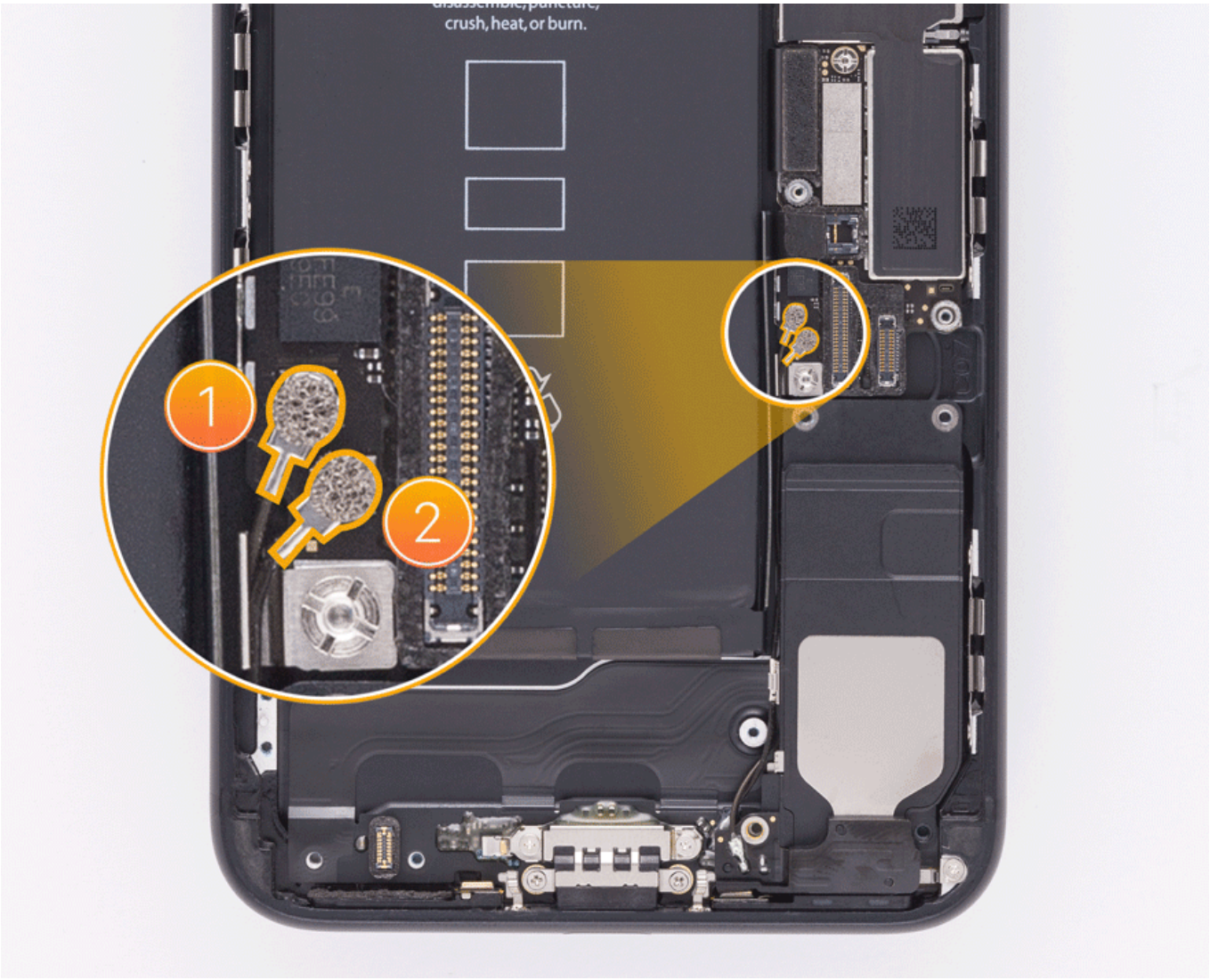
3. Use a black stick to disconnect Taptic Engine flex from enclosure.

4. Use the iPhone torque driver (green) and JCIS bit to remove and discard three cross-head screws from the Taptic Engine.

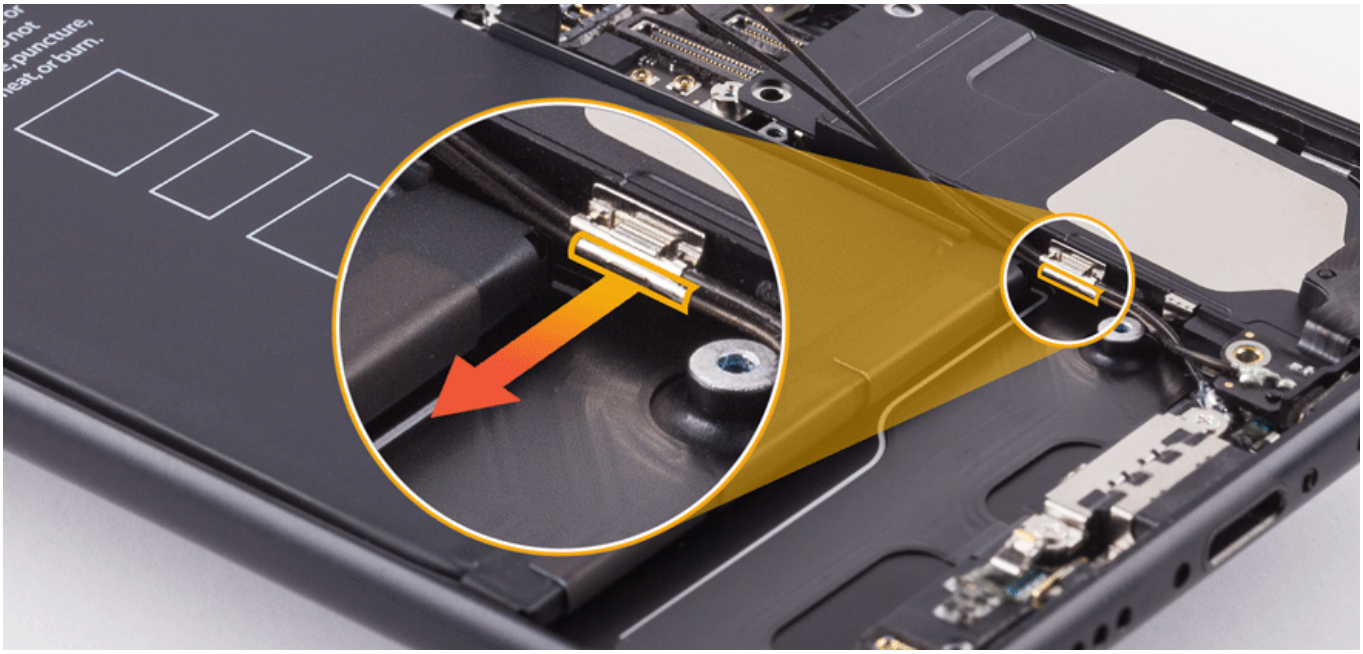
5. Remove the Taptic Engine from the enclosure.

6. Use the iPhone torque driver (green) and JCIS bit to remove and discard four cross-head screws from the speaker.

7. Disconnect two coax cables from the logic board.



8. Unclip two coax cables from the side of the speaker.

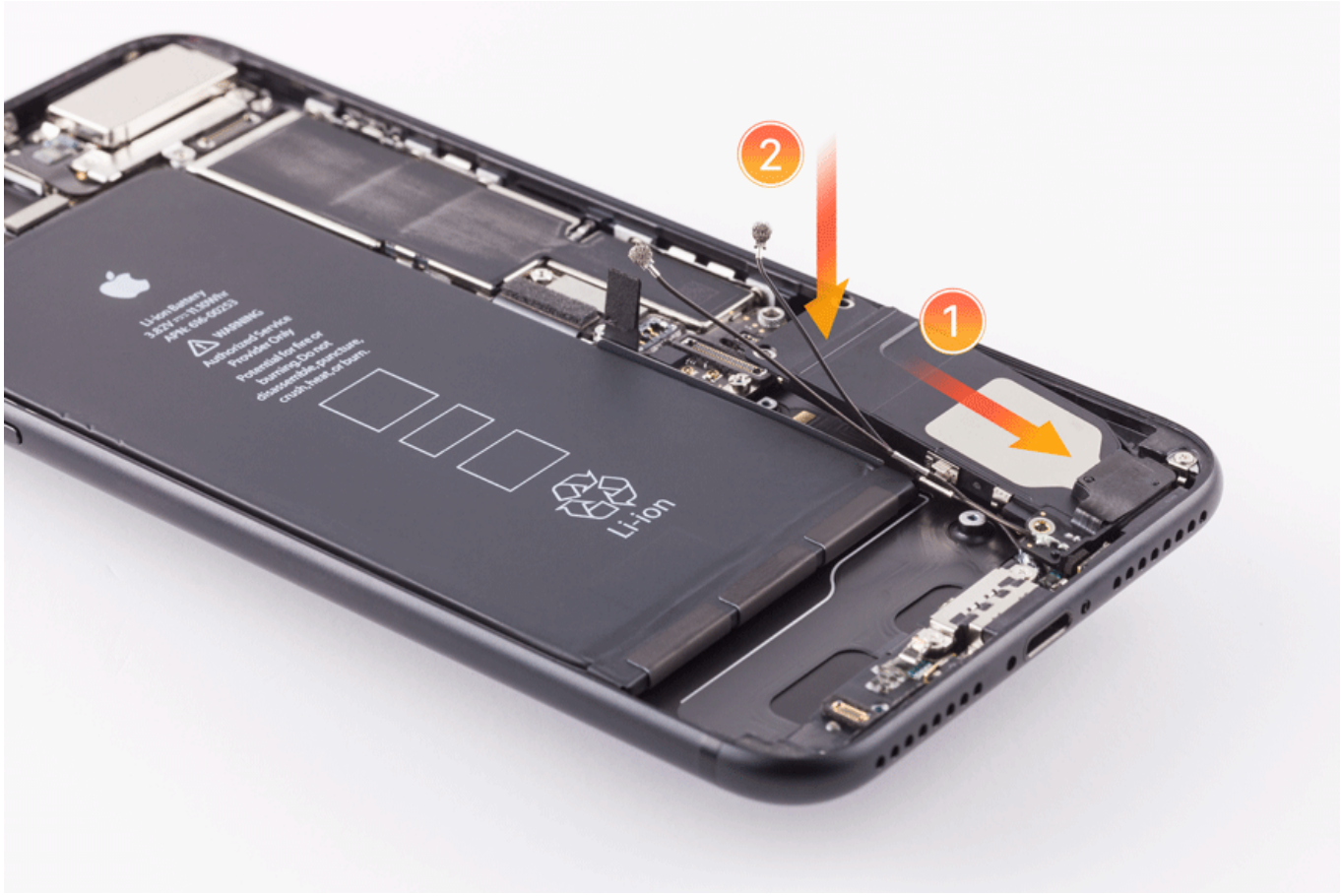


9. Lift the speaker up and remove it from the enclosure.

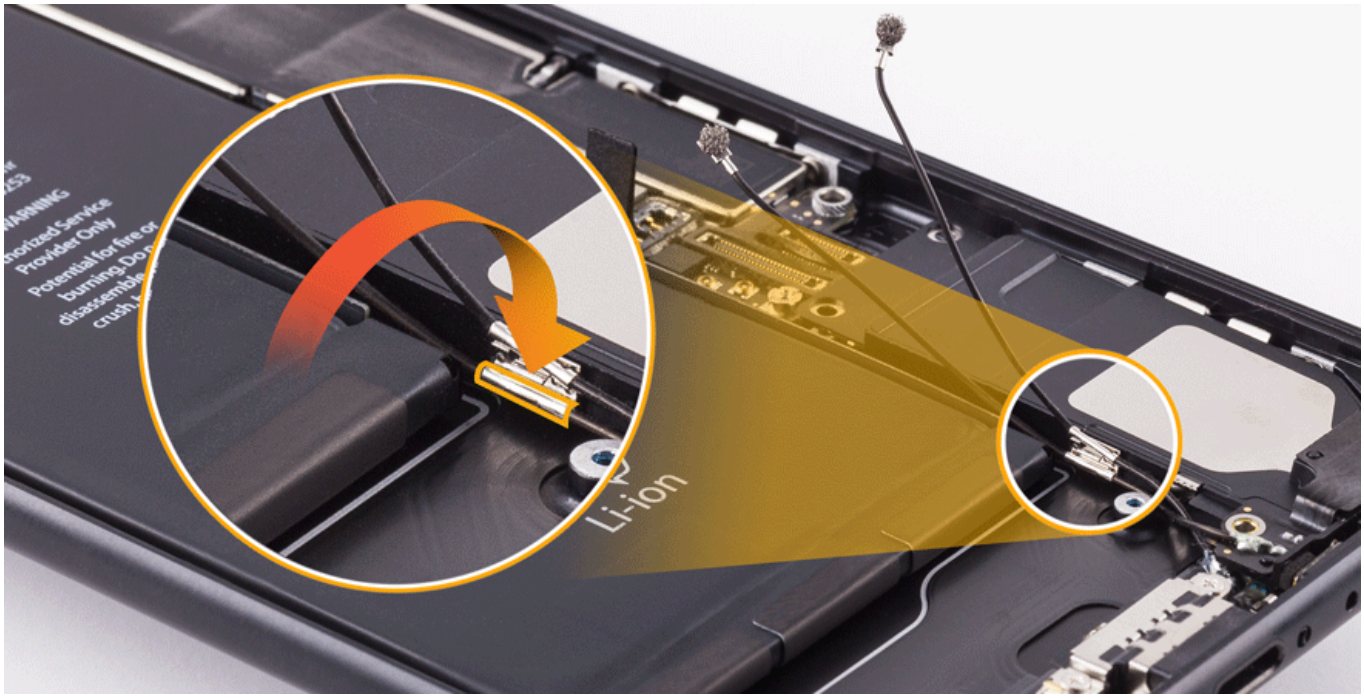
Steps For Reassembly

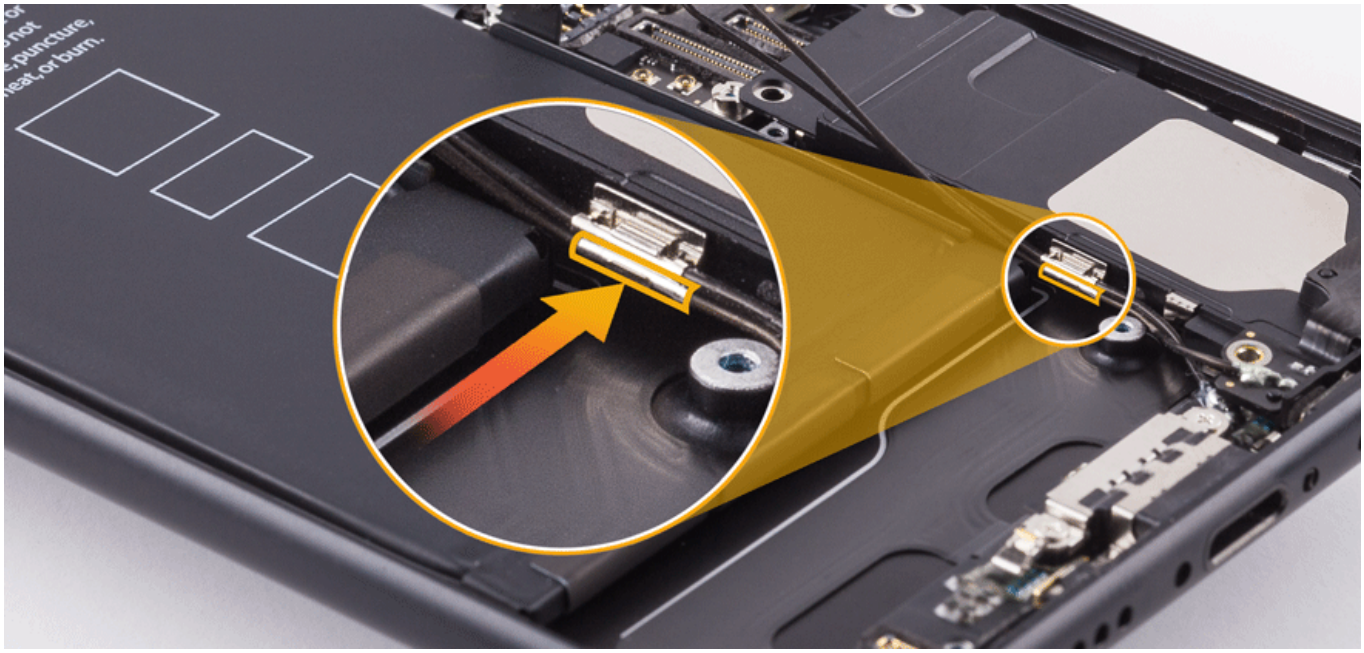
1. Place the speaker into the enclosure.

Important: Avoid trapping the antenna coax cable underneath the speaker during installation.

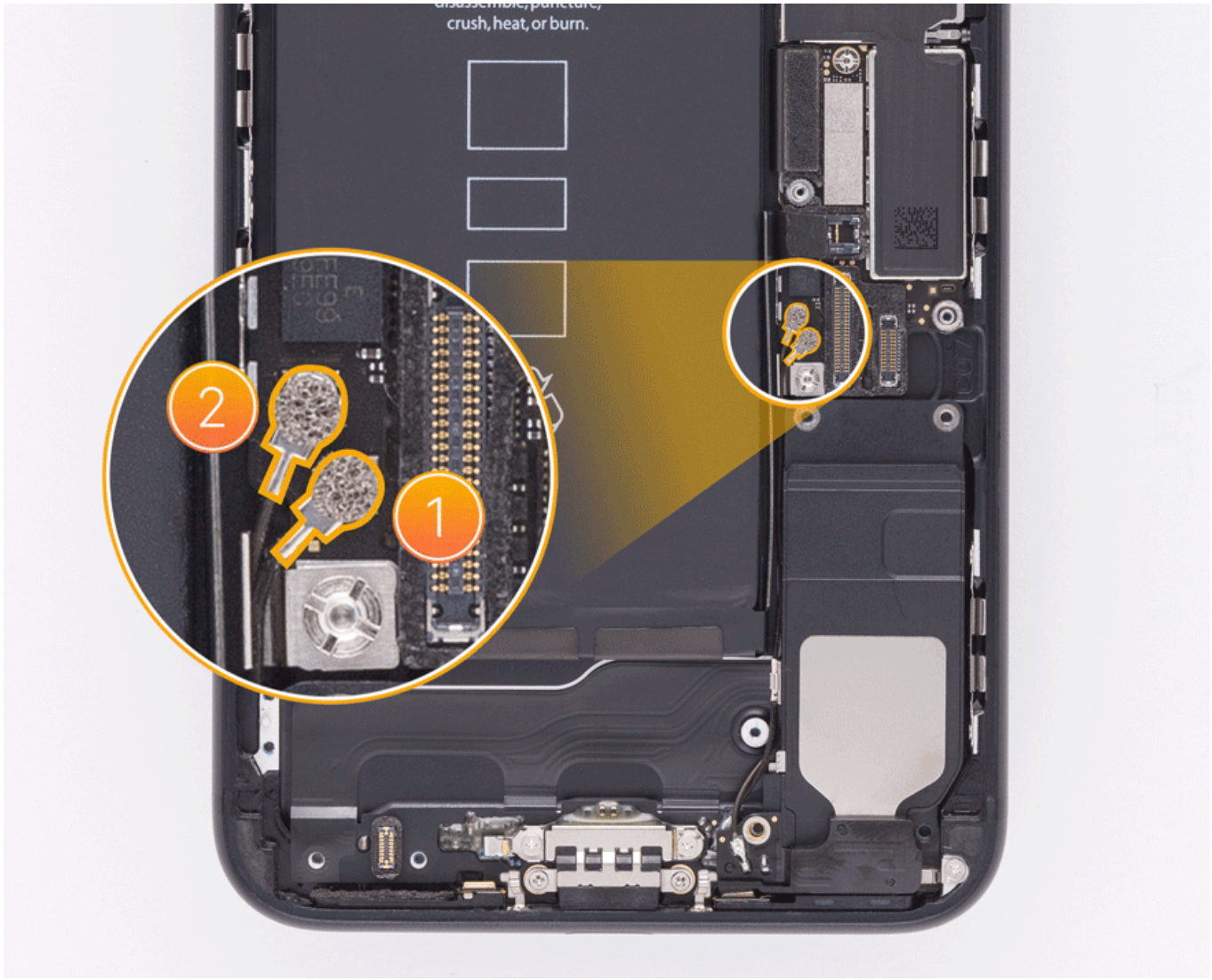


2. Clip two coax cables to the side of the speaker.





3. Connect two coax cables to the logic board.



4. Use the iPhone torque driver (green) and JCIS bit to install four **new** cross-head screws to the speaker.

- 923-01263, upper left and right
- 923-01264, lower right
- 923-01265, lower left

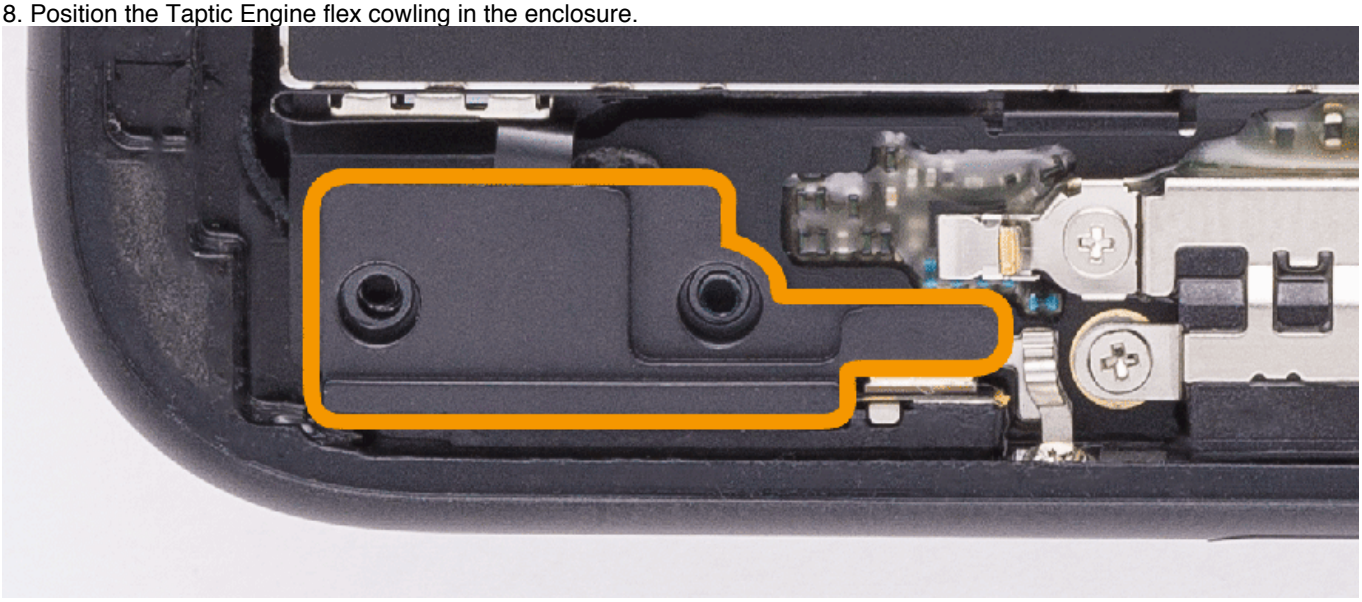
Important: Do not reuse old screws.

5. Connect Taptic Engine flex.

6. Position the Taptic Engine in the enclosure.

7. Use the iPhone torque driver (green) and JCIS bit to install the Taptic Engine with three new cross-head screws (923-01266). **Important:** Do not reuse old screws.

8. Position the Taptic Engine flex cowling in the enclosure.



9. Use the iPhone torque driver (green) and JCIS bit to install the Taptic Engine flex cowling with two new cross-head screws.

- 923-01268, left
- 923-01269, right

Important: Do not reuse old screws.

10. Follow the reassembly steps in article RP1333: Open Device.

11. **Important:** Check iPhone operation using the steps in article TP1045: Functional Test.

Completing a Repair

Test Functionality

Test the device according to the procedures outlined in TP1045: Functional Test. Attempt to repeat the original issue(s) reported by the user, using whatever function(s) of the device were affected.

The device should be 100 percent operational before giving it back to the user.

Verify Cellular Account

Make sure the user's SIM card is installed and ask the user to verify their phone number is correct in Settings > Phone.

Clean Device

Clean the device with a micro-fiber polishing cloth. **DO NOT** use chemicals or liquids.

Handle Defective Parts

All defective modules should be returned to Apple. Reuse the packaging that contained the replacement part(s).

iPhone Functional Test

The purpose of this procedure is to determine the functional state of an iOS device before and after a repair. Before a repair, use this procedure to determine if any additional service is needed. After a repair, for devices running 10.3 or later, use Diagnostics Mode to run the AST 2 diagnostic suite(s) recommended in TP1570: Diagnostics Mode to verify the device's functionality. Devices running iOS 10.2.1 and earlier should continue to use the functional tests listed in this article. **Note:** Some feature-specific tests may not apply to the device under test.

Attempt to repeat the original issue or issues reported by the user and verify that no new issues are present after opening the device. If the user is reporting battery issues, use AST 2 to test the battery. Confirm that the device is fully operational before returning it to the user. Use AST 2 diagnostics to assist in testing for reported issues. See TP1279: Supported Products and Tests for more information on AST 2 diagnostics.

1. Test Cellular and Wi-Fi Connectivity, Video Playback, and Speaker Sound Quality
2. Test Bluetooth
3. Test Headset and Proximity Sensor
4. Test Bottom Mic, Speaker, and Receiver Sound Quality
5. Test Cameras, Rear Mic, and Front Mic
6. Test Multi-Touch and Accelerometer
7. Test Buttons, Switches, and Vibe
8. Test Ambient Light Sensor
9. Test Location Services
10. Test Touch ID (iPhone 5s and later)
11. Test 3D Touch and Taptic Engine (iPhone 6s and later)

1. Test Cellular and Wi-Fi Connectivity, Video Playback, and Speaker Sound Quality

a. Run the Mobile Resource Inspector (MRI) diagnostic suite in AST 2, which tests for the presence of Wi-Fi hardware.

b. Check that the user's SIM card is installed. Ask the user to verify that their phone number is correct in Settings > Phone.

c. Make a test phone call to an approved toll-free number. This will test cellular connectivity and sound quality for phone calls.

d. Go to Settings > Wi-Fi and connect to a known-good Wi-Fi network.

e. Play video from apple.com and verify that the video and audio play correctly. This will test the video playback and the speaker. For iPhone 7 and 7 Plus: Hold device in landscape orientation. Go to Settings > General > Accessibility and adjust balance to the left, and then to the right. Be sure that Mono audio is turned off. Replay the video to test the left and right speakers in isolation.

f. Repeat steps d and e connected to a 2.4 GHz network and connected to a 5 GHz network, if available.

2. Test Bluetooth

a. Run the MRI diagnostic suite in AST 2, which tests for the presence of Bluetooth hardware.

b. Make a known-good Bluetooth device available locally. Check that the Bluetooth device is on and discoverable.

c. On the customer's device, go to Settings > Bluetooth.

d. Verify that Bluetooth is on. The device will search for nearby Bluetooth devices.

e. Pair the user's device with the Bluetooth device.

f. To unpair a device, tap the blue circle to the right of the device's name and then tap "Forget this Device."

3. Test Headset and Proximity Sensor

a. Connect EarPods to iPhone.

b. Launch the Voice Memos app.

c. Record a short voice memo by tapping the red circle. Blow in to the headset microphone to verify functionality.

d. While recording, cover the top front of the iPhone with your hand. The display should go blank.

e. Remove your hand. The display should turn back on when the proximity sensor is uncovered.

f. When finished recording, tap Done.

g. Enter a name for the recording, then tap OK.

h. Tap the recording.

i. Tap the play (triangle) button to begin playback. Listen to the playback through the EarPods, and adjust volume using the headset remote control.

j. Make a test phone call with a known-good SIM and with full cellular signal strength for at least one minute. During the call, verify the sound quality of the EarPods and headset microphone.

4. Test Bottom Mic, Speaker, and Receiver Sound Quality

a. Launch the Voice Memos app.

b. Record a short voice memo by tapping the red circle.

c. When finished recording, tap Done.

d. Enter a name for the recording, then tap OK.

e. Tap the recording.

f. Tap the play (triangle) button to begin playback. **Note:** To toggle between receiver and speaker, use the Speaker button in the top right corner of the display.

g. Make a test phone call with a known-good SIM and with full cellular signal strength for at least one minute. During the call, verify the sound quality of the receiver, speaker, and microphone.

5. Test Cameras, Rear Mic, and Front Mic

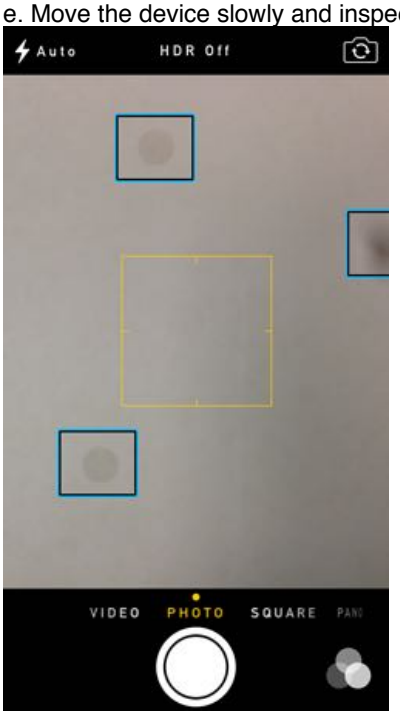
a. Run the MRI diagnostic suite in AST 2, which tests for the presence of front and rear cameras.

b. Remove any protective case that may interfere with the camera lens or flash.

c. Download the iPhone Camera Test Image (PDF) and print out a color copy on white, unlaminated paper. Do not modify, alter, or laminate the image.

d. Launch the Camera app. Aim the device at a clean, blank sheet of white paper.

e. Move the device slowly and inspect the preview image for anomalies, such as circles or dust spots.



f. Record video with the iSight camera. Check the recording for video and audio quality. This will test the iSight

camera and rear mic.

g. Take photos and check focusing with the iSight camera.

- Start in landscape orientation and hold the device eight inches (~20 cm) from the test image.
  iPhone 6 or newer: The test image should quickly come into focus.
  Other models: Once steady, the yellow focus square should appear briefly and the test image should be in focus.

- Keep the device in landscape orientation and hold the device three feet (~1m) from the test image.
  iPhone 6 or newer: The test image should quickly and seamlessly come into focus.
  Other models: Once steady, the yellow focus square should appear shortly, with the test image eventually brought into focus.

- Rotate the device to portrait orientation and hold the device three feet (~1m) from the test image.
  iPhone 6 or newer: In a well-lit room, the test image should stay in focus as you rotate. If the room is not well lit, the yellow focus square may appear. The image should not jump around or be severely out of focus during rotation.
  Other models: Once steady, even though the test image is already in focus, the yellow focus square may still appear in the preview indicating that the camera is trying to refocus. This is normal. Once the focus is complete, the test image should still be in focus.

- Keep the device in portrait orientation and hold the device eight inches (~20 cm) from the test image.
  iPhone 6 or newer: The test image should quickly come into focus.
  Other models: Once steady, the yellow focus square should appear shortly, with the test image eventually coming into focus.

- Verify that the primary colors are representative of the printed test image and that there are no dark spots near the edges of the photo.

h. Change the focus area and set the exposure: The yellow square on the screen shows the area where the camera is focusing the shot. Tap the screen to focus on the circle of the test image.

i. Set flash mode (camera or video mode): Tap the flash button, then tap On.

- If possible, take the photo in a dim or darkened area to show where the flash is lighting.
- Check that the flash is lighting the circle in the test image and that the flash is not shifted to one side.

j. Zoom in or out: Pinch the screen, then use the slider at the bottom of the screen to zoom in or out.

k. Touch the icon to select the FaceTime camera. Repeat steps d–i above. This will test the FaceTime camera, front mic, and the Retina Flash. **Note:** The FaceTime camera does not zoom, and only has a flash on iPhone 6s, 6s Plus, SE, 7, and 7 Plus. The Retina Flash is only available in photo and square modes. It may be easier to hold the printed test image in front of the iPhone to test the FaceTime camera.

Additional Testing for iPhone 7 Plus:

Use the iSight camera slow-motion mode to record short videos of the printed test image and verify video quality.

a. Switch the camera to slow-motion mode and keep the device in either landscape or portrait orientation.

b. Set to 1x zoom, hold the device eight inches (~20cm) from the test image, tap to focus, and record a short video. Pinch the screen to zoom in and out.

c. Stay in 1x zoom, hold the device three feet (~1m) from the test image, tap to focus, and record a short video. Pinch the screen to zoom in and out.

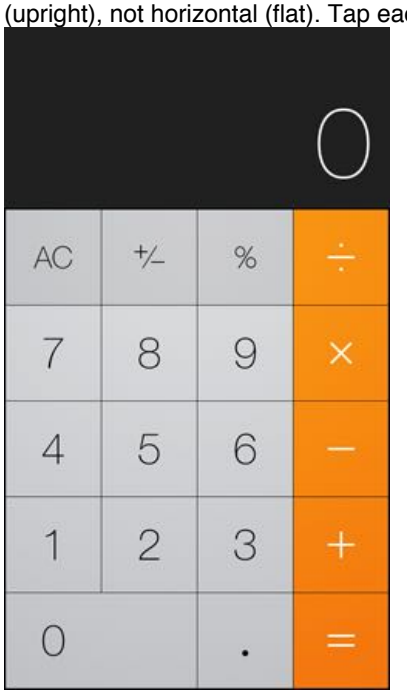
d. Tap 1x to switch to 2x zoom, hold the device three feet (~1m) from the test image, tap to focus, and record a short video. Pinch the screen to zoom in and out.

e. Stay in 2x zoom, hold the device 20 inches (~50cm) from the test image, tap to focus, and record a short video. Pinch the screen to zoom in and out.

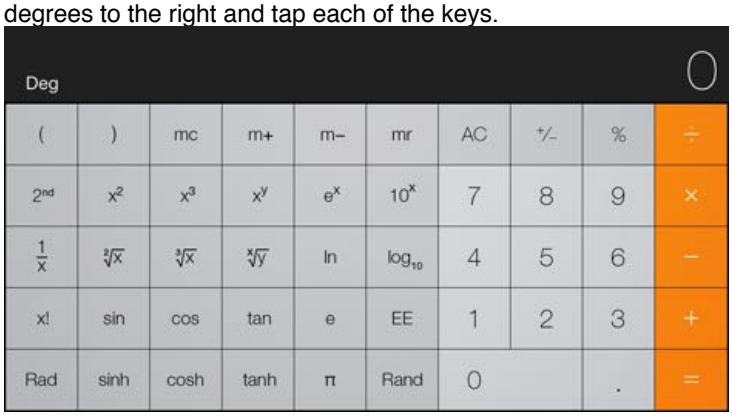
6. Test Multi-Touch and Accelerometer

a. Run the following AST 2 diagnostic suites: use Multi-Touch to test for Multi-Touch response issues; use Unexpected Touch to test for overly sensitive touch response issues; use MRI to test for the presence of Multi-Touch and Accelerometer hardware.

b. Launch the Calculator app to test all but the top section of the screen. Hold the device in a vertical plane (upright), not horizontal (flat). Tap each button on the calculator to verify activity.



c. Rotate the device to the left to launch the scientific calculator. Tap each of the keys. Rotate the device 180 degrees to the right and tap each of the keys.



7. Test Buttons, Switches, and Vibe

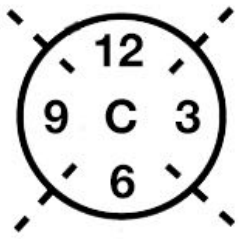
Test buttons, switches, and vibe for expected functionality and tactility.

a. Run each of the button and switch diagnostic suites in AST 2. Each suite tests the functionality of a specific button or switch.

b. Test the Home button using the following steps, depending on model.

iPhone 6s, 6s Plus, SE and earlier

- Test clicks and double-clicks on the Home button.
- Press and hold the Home button for Voice Control or Siri.
- With the display off, press the center of the Home button and verify that the display turns on.
- Use the pointed end of a black stick to repeat the same test for the top, bottom, left, and right edges of the Home button (as shown by the numbers in the image below). The display should turn on when pressing any of these five locations.



- If no functional issues are found after testing the button with a black stick, use your finger or thumb to test for button stiffness, looseness, or mechanical symptoms.

iPhone 7 and 7 Plus

- Test single-clicks and double-clicks on the Home button.
- Press and hold the Home button for Voice Control or Siri.
- With the display off, press the center of the Home button and verify that the display turns on.
- When pressing the Home button, verify that the taptic feedback simulates a physical button press.
- If the Home button does not respond in the above steps, test Touch ID functionality in Section 10 of this article.

c. Use your finger to repeatedly press the volume up/down buttons and verify that the sound level indicator on the display is changing.

d. Use your finger to toggle the Ring/Silent switch back and forth and look for a bell icon on the screen.

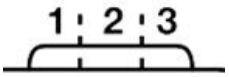
e. Press the Ring/Silent switch and verify that the bell icon does not appear on the screen. **Note:** Do not toggle the switch.

f. Test the vibrate function.

1. Go to Settings > Sounds > Ringtone > Vibration.
2. Choose S.O.S.
3. Verify that the phone vibrates in the correct pattern.

g. Locate the Sleep/Wake button on the device, near the top right corner.

- Use the pointed end of a black stick to press the left side of the Sleep/Wake button (1 in image below) once, to put the device into sleep mode (the display will turn off).
- Use the pointed end of a black stick to press the center of the Sleep/Wake button (2 in image below) once, to wake the device.
- Use the pointed end of a black stick to press the right side of the Sleep/Wake button (3 in image below) once, to put the device into sleep mode (the display will turn off).
- Use your finger to press the button again to wake the device.
- Use your finger to press and hold down the Sleep/Wake button until “slide to power off” appears on the screen.



h. If no functional issues are found after testing buttons with a black stick, use your finger or thumb to test for button stiffness, looseness, or mechanical symptoms.

8. Test Ambient Light Sensor

The ambient light sensor (ALS) automatically adjusts the display brightness to an appropriate level for the current ambient light conditions. The ALS brightens the display when using the device in a bright light environment, and dims the display in low light.

a. Run the MRI diagnostic suite in AST 2, which tests for the presence of ALS hardware.

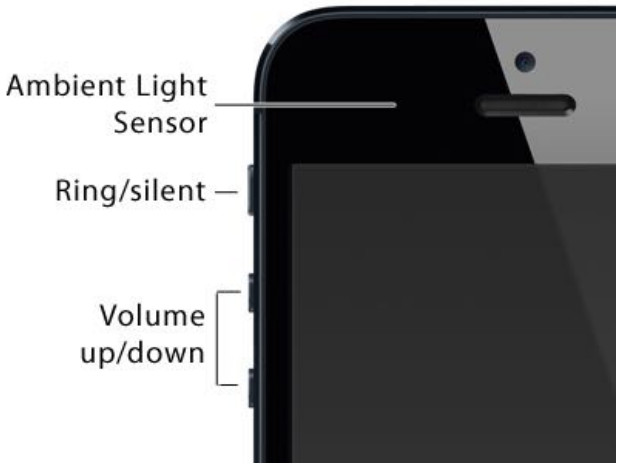
b. Toggle Auto-Brightness off and then on in Settings > Display & Brightness.

c. Press the Sleep/Wake button to put the device into sleep mode.

d. In a bright light environment, cover the top third of the front of the device to block the light (the base of your hand works well). The ALS is located near the receiver.

e. Press the Sleep/Wake button to wake the device. While the ALS is covered, the display should be dim.

f. Uncover the top of the device. After a few seconds, the display should return to its normal brightness.



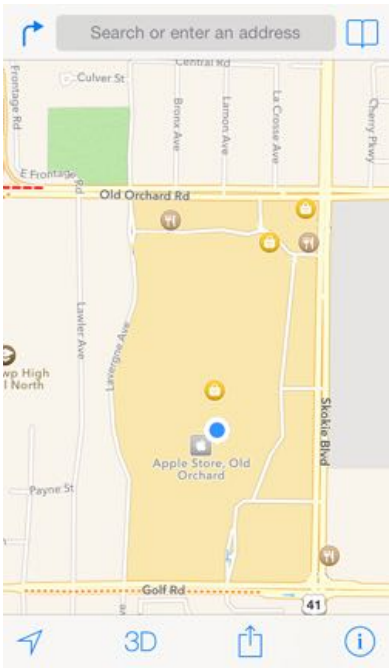
9. Test Location Services

Location services depend on data service availability. Data services are subject to change and may not be available in all areas. This may result in unavailable, inaccurate, or incomplete maps, directions, or location-based information. Maps uses Wi-Fi hotspots to determine the most accurate location. For more information, refer to article HT203033: About privacy and Location Services in iOS 8 and later .

a. Run the MRI diagnostic suite in AST 2, which tests for the presence of gyroscope and compass hardware.

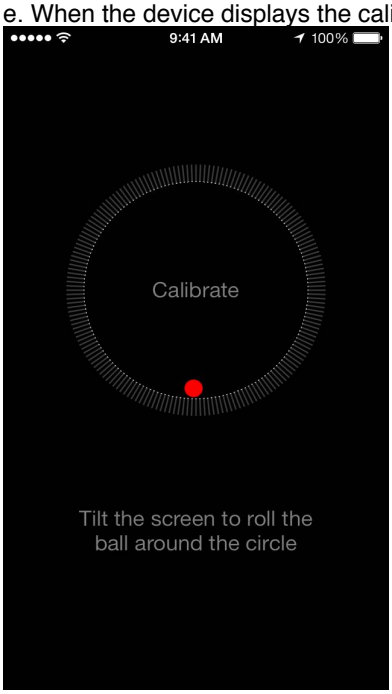
b. Go to Settings > Privacy > Location Services and turn on Location Services.

c. Launch the Maps app and tap the arrow in the lower left corner of the screen. Maps should display the device's current location.



d. Open the Compass app.

e. When the device displays the calibration alert, tilt the screen to move the red ball around the circle.



f. Verify that when the iPhone is rotated, the heading shown on the screen changes according to the motion of the device.

10. Test Touch ID (iPhone 5s and later)
This test should be performed with the user to verify Touch ID functionality. Ensure that the Home button and your finger are clean and dry.

a. Run the MRI diagnostic suite in AST 2, which tests for the presence of Touch ID hardware.

b. Go to Settings > Touch ID & Passcode and tap “Add a Fingerprint...”

c. Hold the device as you normally would when touching the Home button.

d. Touch your finger to the Home button and hold it there until you feel a quick vibration or you are asked to lift your finger. **Tip:** Do not press the button, just touch lightly.

e. Continue to touch and lift your finger slowly, making small adjustments to the position of your finger each time.

f. Once the initial scanning is complete, you will be asked to adjust your grip in order to capture the edges of your

fingerprint.

g. Hold the device as you normally would when unlocking it, touching the adjacent outer areas of your fingertip instead of the center portion you initially scanned.

h. Press the Sleep/Wake button to lock the screen.

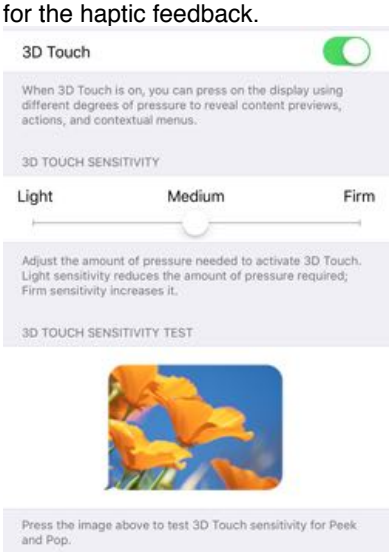
i. Press the Home button or Sleep/Wake button once to wake the device and keep your finger lightly on the Home button. The device will unlock when the fingerprint is recognized.

11. Test 3D Touch and Taptic Engine (iPhone 6s and later)
This test should be performed with the user to verify 3D Touch and Taptic Engine functionality.
Note: The iPhone must pass the Multi-Touch test above or the AST 2 diagnostic suites: Multi-Touch, Unexpected Touch, and MRI.

a. Go to Settings > General > Accessibility > 3D Touch and confirm that the 3D Touch setting is enabled and sensitivity is set to Medium. 3D Touch must be enabled for 3D Touch and Taptic Engine functionality.

b. Go to Settings > General > Accessibility > Vibration to enable the Taptic Engine.

c. Use the 3D Touch Sensitivity Test to check the Peek and Pop functions. Look for the visual feedback and feel for the haptic feedback.



Peek

Pop

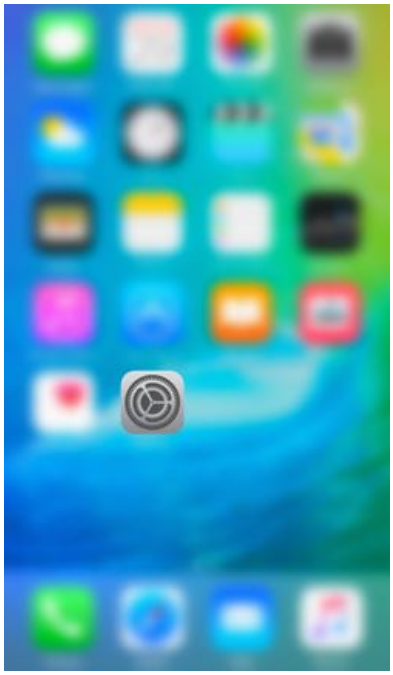
d. Press the Home button to return to the Home screen.

e. Hold the iPhone with the display perpendicular to the floor.

f. Firmly press on one icon in the center of the display to test 3D Touch. Look for visual feedback. If the app does not support 3D Touch, then the area around the app icon will blur. If the app supports 3D Touch, then a contextual menu will appear with a background blur.

3D Touch Support

No Support



g. Feel for haptic feedback when pressing the app icons.

h. Hold the iPhone with the display parallel to the floor and repeat steps f and g.

Service Content Feedback

This escalation path is intended only for content issues with articles that begin with the prefixes listed below.

Article prefix	Escalate to
IT	itsflows@group.apple.com
OP, RS, SN	srvcomms@group.apple.com
RP, SD, SM, TP	serviceguides@group.apple.com
SV	servicevideos@group.apple.com

Please provide a clear and concise description of the content issue you encountered and steps to reproduce. Other information that helps us help you:

- Article number(s) and titles
- Serial number(s)
- Screenshots or screen recording

Note: You may not receive a response, but all comments will be reviewed and investigated as needed.